

622 X-1
R-4

The Mining Journal

LONDON, JUNE 3, 1960

Vol. 254. No. 6511.

THE JOHN CRERAR LIBRARY

Price Ninepence

JUN 20 1960

A SERVICE FOR THE MINING INDUSTRY

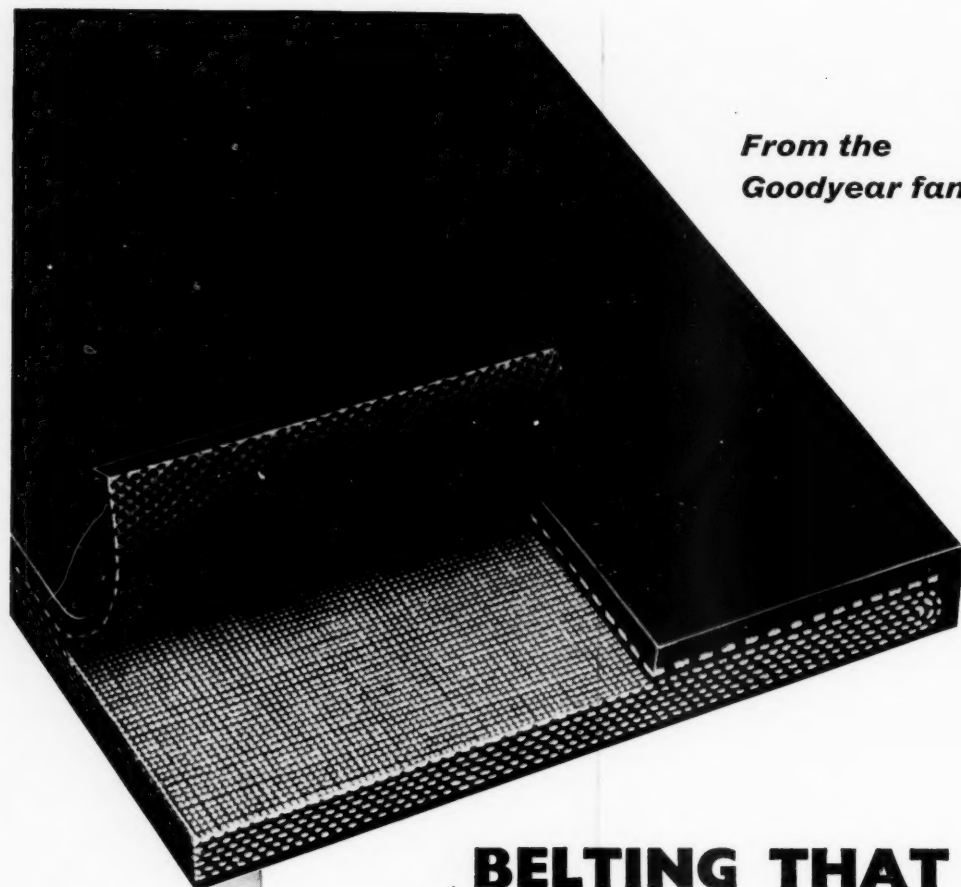
Behind the Cementation mining service is the experience of 40 years' knowledge of shaft sinking and mine development. In addition the backing of the international Cementation Group ensures that the Cementation mining service is unsurpassed in any part of the world.



Cementation

The Cementation Company Limited · Mining Department · Bentley Works, Doncaster · Head Office: 20 Albert Embankment, S.E.11

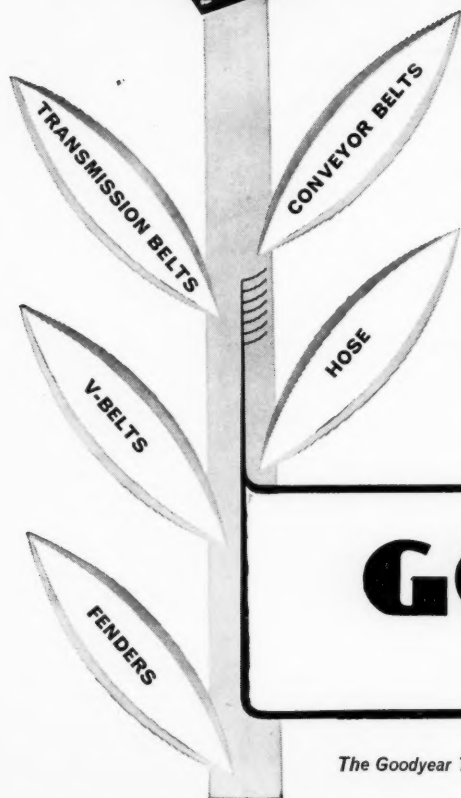
*From the
Goodyear family tree*



BELTING THAT TAKES A LOT OF BEATING

Whatever material you want to move, whatever the conditions, you'll find the conveyor belt for the job in the Goodyear family tree! For abrasive coke or hot sinter . . . oily materials or sharp stone . . . food and coal . . . a 'job-designed' Goodyear belt is your best choice for longest, low-cost performance. Special features include: good troughing, high impact resistance and flex life, and resistance to mildew. Get in touch with Goodyear now for Britain's most comprehensive conveyor belt service.

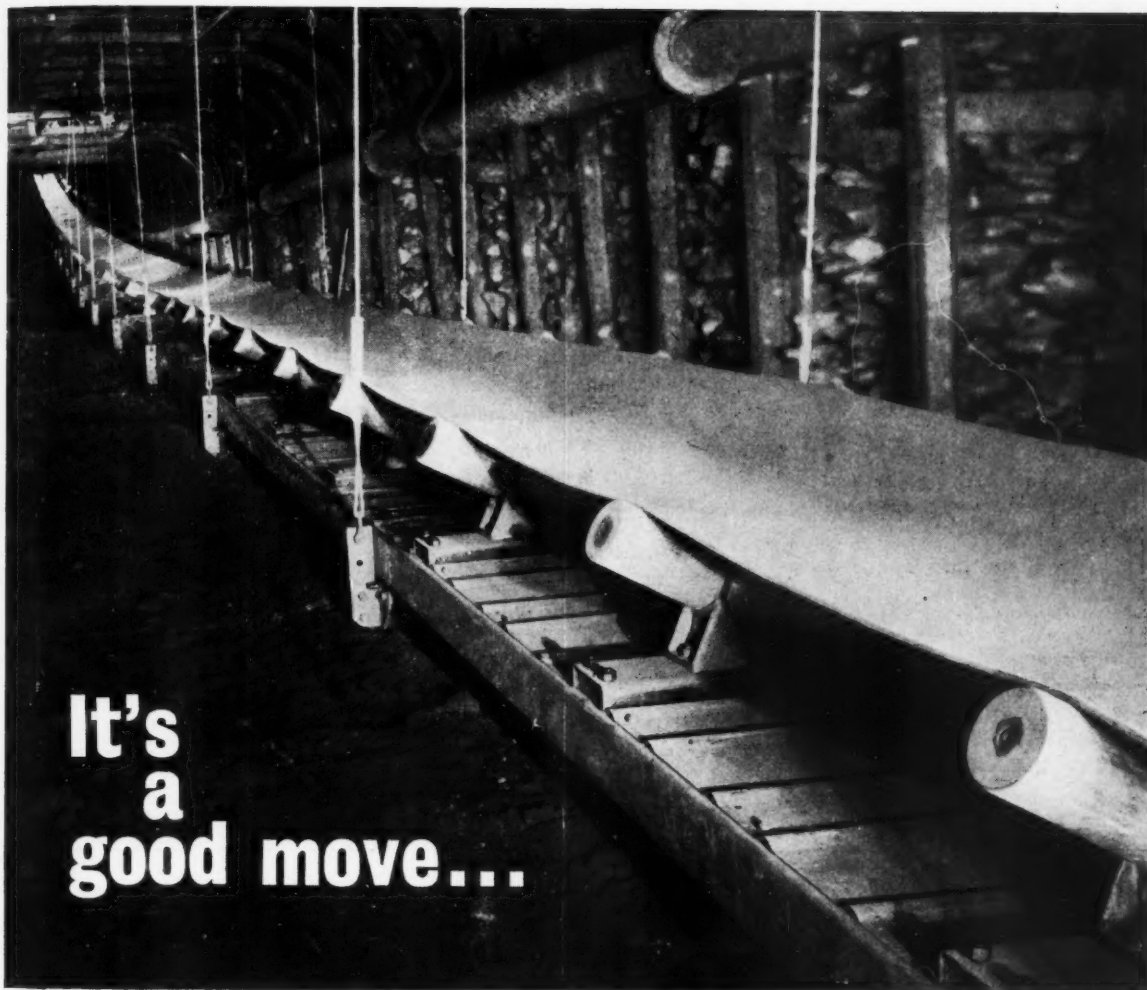
- * Tough cover compounded to suit job
- * Breaker fabric between cover and carcass — where required
- * Plies of close-woven cotton duck, or synthetic fibres mildew inhibited
- * Skim coat between plies to increase flexibility, prevent separation
- * Substantial edge cover to resist wear



GOOD YEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tyre & Rubber Company (G.B.) Ltd., Industrial Rubber Products Dept., Wolverhampton.
Export Enquiries: 17 Stratton Street, London W.1



**It's
a
good move...**

to install *Nylon* conveyor belting and reduce your cost per ton carried

Nylon heavy duty conveyor belting has real working strength. This practical advantage is strong on the right side of the ledger too. Nylon conveyor belts give a lower cost per ton carried than any other type of conveyor belting. Reductions in maintenance and replacement costs add up to an impressive figure. Nylon has high tensile strength and energy absorption; outstanding resistance to impact, abrasion of the edges and damage from flexing.

It cannot rot, is highly flexible, troughs better and allows smaller diameter drums to be used. For further facts and details about the unique qualities of nylon conveyor belting, please write to British Nylon Spinners Limited, 68 Knightsbridge, London, S.W.1.

Photograph by permission of the National Coal Board. Trunk conveyor, 1109 yards between centres, at Haig Colliery, Cumberland. 42 inches wide, 4 ply CN80 (nylon weft) belt by Barrow Hepburn & Gale, Mitcham.

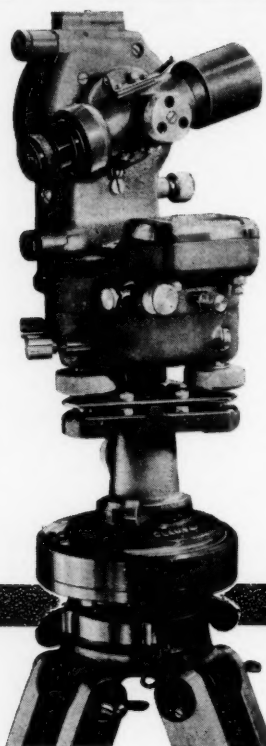


It's *Nylon* for strength

BRITISH NYLON SPINNERS LIMITED

Nylon conveyor belts are in daily use in Coal Mines, Open Cast Coal Mines, Quarries, Electricity Generating Stations, Sand and Gravel Pits, Brickworks, Iron and Steel Works, and Gas Works in U.K. and throughout the world.

Watts Mining Transit



For elementary surveying above and below ground to an accuracy better than 1 : 3000.

The Mining Transit is a simple, light instrument with glass circles divided at 5-minute intervals, and it is easily read to 1 minute.



For full details, write for CS 58/h38

HILGER & WATTS LTD., 98 ST. PANCRAS WAY, LONDON, N.W.1
Telephone: GULiver 5636



Growth in GHANA...

Big civil engineering contracts call for light railway equipment that will give long trouble-free service under tough working conditions.

That's why Hudson trucks were used on the contract for the building of Ghana's new deepwater harbour at Tema.

Hudson
LIGHT RAILWAY MATERIALS

**ROBERT HUDSON LTD., RALETRUX
HOUSE, MEADOW LANE, LEEDS**

Telephone : Leeds, 20004

Telegrams : Raletrux, Leeds



MEET THE
JAGGED FORCE
OF GRANITE WITH

BTR "RHINOCEROS" CONVEYOR BELTING

the PREMIUM grade—way ahead of all other top-quality belts

- Toughest ever covers to withstand the abrasion, cutting, and gouging of jagged-edged boulders of granite.
- Strongest multi-ply carcass to withstand IMPACT of falling boulders at loading points. High tensile constructions when needed.
- Integral moulding of extra-thick edges and covers gives maximum resistance to damage.
- The toughest and most durable belting specially made for carrying such heavy ores as manganese, copper, and iron, as well as granite and rock, BTR RHINOCEROS ensures longer life, lower maintenance costs, better value for money.



ENGINEERS IN RUBBER

BTR Industries Ltd

BRITISH THERMOPLASTICS & RUBBER MANUFACTURERS
HERGA HOUSE, VINCENT SQUARE, LONDON S.W.1

Phone: VICTORIA 3848

Telex 22524

Cables: Britgoods, London

Other BTR Products include: "High-Test" industrial V-Belts and transmission belting—industrial hoses and flexible pipes—Vibro-insulators—industrial rubber boots—"Cutless" rubber bearings for ships and pumps—aircraft de-icing equipment

RapieR WALKING D

The RapieR range of Walking Draglines is wide and comprehensive enough to meet every condition of stripping and excavating wherever draglines can be used. No matter how big or exacting your problem, there is a RapieR Walking Dragline to fit your requirements—from the W300 with buckets

up to 7 yds. to the newest W1800 with buckets up to 40 yds. RapieR Draglines, backed by Ransomes and Rapier's long experience in design, and their high engineering standards, are now working under varying conditions in many different countries of the world.

RapieR W600

With its enormous power and reach this RapieR W600 removes 80 feet of overburden from an iron ore bed.



Parts of the V

TYPE

W 1

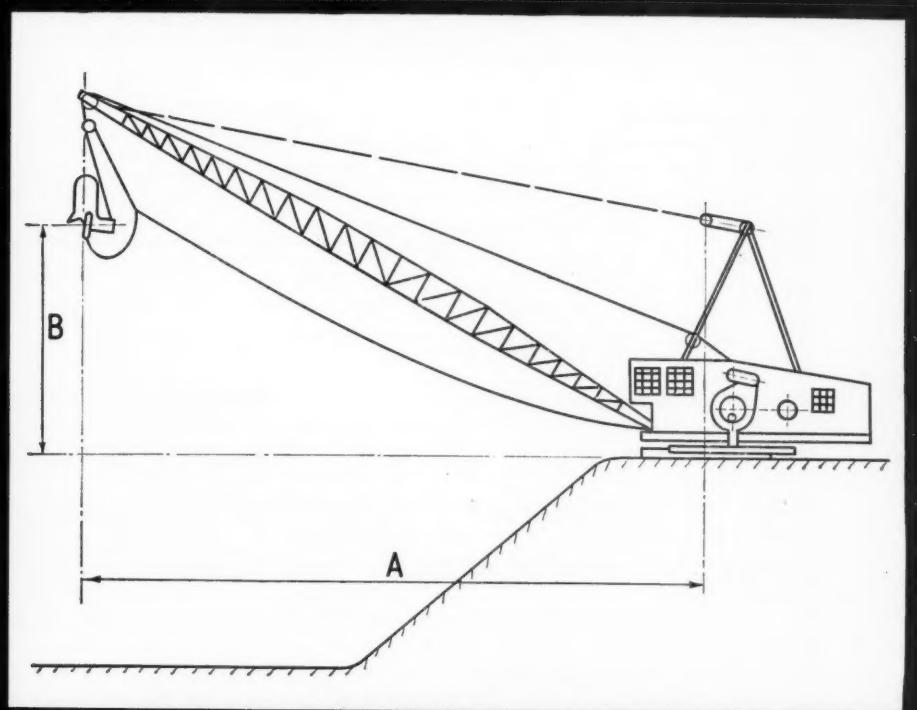
W 3

W 6

G DRAGLINES

from 3 to 40 cu.yds. capacity

Parts of the W 1400 being made at Ipswich



THE FULL RANGE OF RAPIER WALKING DRAGLINES

TYPE	LENGTH OF BOOM	BUCKET CAPACITY CU. YD.	DUMPING RADIUS A	DUMPING HEIGHT B	WEIGHT IN TONS	TYPE	LENGTH OF BOOM	BUCKET CAPACITY CU. YD.	DUMPING RADIUS A	DUMPING HEIGHT B	WEIGHT IN TONS
W 150	149' 0"	3 to 3½	148' 0"	46' 0"	193	W 900	247' 0"	16	230' 0"	100' 0"	950
	132' 0"	4 to 5	132' 0"	35' 0"	189		229' 6"	18	215' 0"	93' 0"	
	121' 0"	5 to 6	118' 0"	38' 0"	186		195' 0"	23	185' 0"	76' 0"	
	121' 0"	6 to 7	105' 0"	57' 6"	184						
W 300	180' 0"	5 to 6	178' 0"	70' 0"	375	W 1350	271' 0"	20 to 24	250' 0"	112' 0"	1375
	140' 0"	7 to 8½	142' 0"	52' 0"	375		248' 0"	29	230' 0"	103' 0"	
W 600							230' 0"	33	215' 0"	93' 0"	
	204' 9"	8 to 10	201' 0"	72' 0"	792	W 1400	282' 0"	20 to 24	260' 0"	140' 0"	1650
	186' 0"	10 to 12	184' 0"	65' 0"	777	W 1800	303' 0"	20 to 24	280' 0"	150' 0"	1850
	165' 0"	12 to 15	165' 0"	55' 0"	776		282' 0"	30	260' 0"	120' 0"	
							247' 0"	40	230' 0"	100' 0"	

RANSOMES & RAPIER LTD.

IPSWICH · ENGLAND

A Newton Chambers Company

THE BRITISH METAL CORPORATION LIMITED

PRINCES HOUSE • 93, GRESHAM STREET • LONDON, E.C.2

and at Birmingham and Swansea

Telephone :
MONarch 8055

Telegrams :
Brimetacor London

Telex :
London 28408

AUSTRALIA	Sydney, Melbourne and Perth
CANADA	Montreal, Toronto and Vancouver
INDIA	Calcutta and Bombay
PAKISTAN	Karachi and Lahore
SOUTH AFRICA	Johannesburg and Pietersburg
SOUTHERN RHODESIA	Bulawayo and Salisbury
UGANDA	Kikagati

VIVIAN YOUNGER & BOND LIMITED, London

NIGERIA Lagos, Apapa, Ibadan, Kano and Port Harcourt

Associated Company :

C. TENNANT SONS & CO. OF NEW YORK

U.S.A.	New York and San Francisco
BOLIVIA	La Paz
BRAZIL	Sao Paulo and Rio de Janeiro
PERU	Lima

The Mining Journal

London, June 3, 1960

In this issue . . .

Britain's Mining Machinery Exporters . . .	639
African Participation at Board Level . . .	640
Automation in Underground Traffic Control . . .	641
Mining at Bikita . . .	642
Targets for Canadian Prospectors . . .	644
The International Lead and Zinc Study Group . . .	645
Pittsburgh Consolidated Sends Coal by Pipeline . . .	646
Technical Briefs . . .	648
Mining Miscellany . . .	649
Metals and Minerals . . .	650
London Metal and Ore Prices . . .	650
Mining Finance . . .	652
British Mining Equipment Export Association . . .	653
Company Meetings . . .	654
South African Gold and Uranium Producers . . .	661
British Nylon Industrial Convention . . .	662

Vol. 254

No. 6511

Established 1835

Editor

U. Baliol Scott

Deputy Editor

A. Graham Thomson

Assistant Editor

R. Bowran

Assistant Financial Editor

R. A. Nuttall

Display Advertisement Manager

E. S. Hooper

Circulation

Robert Budd

Published each Friday by

THE MINING JOURNAL LTD.

Directors

E. Baliol Scott
(Chairman)

U. Baliol Scott
(Managing)

G. A. Baliol Scott

R. A. Ellefsen

**15 WILSON STREET,
LONDON, E.C.2**

Telegraphic
Tutwork London

Telephone
MONarch 2567 (3 lines)

Annual Subscription £3 10s. Single copy ninepence

Britain's Mining Machinery Exporters

THE recently formed British Mining Equipment Export Association has made public this week a first list of its members and has outlined its objectives to the Press. The list of member firms appears on page 653.

As many British manufacturers will be aware, this most commendable development has been in the making for some little time, and the fact that the Association is now ready to talk publicly about its intentions would seem to suggest that it is moving out of its initial formative stage to the point where we shall begin to see it in action.

The present size of the Association's membership—thirty-three—is small in relation to the number of firms which can eventually be expected to join. Indeed, the Association believes that there are between three and four hundred British manufacturers for whom the mining industry overseas provides a market for some at least of their products. In the majority of cases, however, this market only represents a small part of the company's turnover, and it is doubtful whether more than about ten per cent of the firms with an interest in mining would regard this as their principal market.

Although the majority of the prospective members of the Association may regard mining as a subsidiary market, in the aggregate, British exports to the mining industry round the world must add up to a considerable total—possibly as much as £30,000,000 to £40,000,000 a year. Unfortunately, owing to the form in which Board of Trade statistics are at present published, these throw no light on the precise size of this export market. Not only is there a tremendous diversity of machinery and equipment exported to mines (witness the Buyers' Guide appearing in our recently published Annual Review), but many of the same products find a market in other industries besides mining.

No doubt, one of the consequences of the formation of the Association will be that both manufacturers and the government will come to realise in more precise terms the contribution which this particular export market is making, and—more important perhaps—potentially could make, to our economy. Meanwhile, lest the Association's estimate of the present size of Britain's stake in this export market appears unexpectedly high, it should be remembered that the Association is concerned with mining in its widest context, embracing all stages of the mining process from exploration through mining (both underground and open pit) to mineral processing (including coal preparation) and finally to extraction metallurgy.

It is perhaps unnecessary to add that unlike the home market which is based on coal, by far the larger part of the export market for mining machinery is provided by metalliferous mining. Moreover, unlike coal, metal mining seems destined over the next decade to expand no less rapidly than in the years since the war. Although *Mining Journal* readers will require no further elaboration of this point it seems pertinent to compare the Association's estimates of the

present level of British exports with estimates which have been made in other countries of the total average annual capital expenditure which will need to be made in the mining industry throughout the world over the next twenty years if we are to keep pace with population growth and increasing *per capita* consumption. These estimates vary widely but £1,000,000,000 per annum for new mining capacity alone throughout the world would appear to be a conservative figure. The British manufacturer has thus got a very substantial market to go for and the best justification for the formation of the Association is that despite this rapidly expanding world market, Britain's relative share is almost certainly declining.

However, in the past two years, since the onset of the slump in N.C.B. purchasing, the ranks of Britain's habitual mining machinery exporters have been strengthened by the advent of other manufacturers who have only recently found it practicable or expedient to diversify their sales efforts beyond the home market. Some of these firms are only now becoming aware for the first time of the opportunities offered by the metal mining industry, yet the fact is that, aside from a certain amount of special purpose coal-face machinery, the requirements of the mining industry are very much the same whatever the end product may be.

It is unfortunate that until quite recent years there has been an inclination in Britain to think of metal mining and coal mining as two distinct industries, which has tended to obscure the thinking of the British manufacturer who has been accustomed to deal primarily with the home market. Nevertheless it is perhaps significant that the essential interdependence of a great deal of the mining technique employed in coal and metal mining was recently underlined most forcibly in the papers discussed at the Symposium on Shaft Sinking and Tunnelling held in London last July under the auspices of the Institution of Mining Engineers, whose members are concerned principally with coal mining in this country.

Mining Journal readers will recall a series of articles which appeared in these columns two winters ago based on an *M.J.* survey into the problems confronting the British mining machinery manufacturer in export markets. The conclusions to which this survey pointed have in the event proved in all substantial respects to be those which have led manufacturers to form the British Mining Equipment Export Association. As these were examined in considerable detail in our issues of October 17 and December 12, 1958 and January 2 and February 27, 1959, there is little purpose in our going over this ground again in detail now. Briefly, however, it can be said that two main forces have been at work in bringing the Association into being.

On the one hand the switch from home to overseas markets (and equally from coal to metal mining), which has been taking place over the past two years, has brought home to many people how very much higher are the costs of selling in a world export market than to a home nationalized industry. Moreover export selling makes far greater demands on a company's senior technical and commercial personnel, so much so that in many cases it is the extent to which senior personnel is available which constitutes the immediate limiting factor in determining the scale at which export selling can be undertaken.

Indeed the demands on personnel, no less than the level of sales overheads, are so high that only the largest groups can hope to tackle every overseas market. There is therefore a great need, both for identifying those export markets which promise to develop into the most important sales outlets during the years ahead and also of exploring ways of pooling some of the costs of market research and intelligence and even, perhaps, in some cases the costs of selling. The formation of this Association would seem to supply the essential link in developing such co-operative effort.

The second main force which has been at work in the creation of the Association has been the growing realization

of the disadvantage under which both the British manufacturer and the British mining consultant are at present operating in many underdeveloped countries, from which incidentally an increasing proportion of the world's mineral output must come. This disadvantage arises from the absence of any positive government policy aimed at facilitating the injection of British mining know-how and British mining machinery into areas which it is government policy to assist financially.

This lack of policy is in sharp distinction to the close liaison which exists in practically all other leading industrial countries between those concerned with foreign aid as an instrument of national policy and those in a position to supply the mining know-how and the capital goods which alone can transmute financial aid into proof of Britain's good intentions and into lasting evidence of the benefits of British aid.

As it happens, this lack of liaison is particularly unfortunate in the case of mining as, unlike civil engineering and certain other industries where the prime contractor is frequently the spearhead for the export selling of capital goods, in the mining industry it is inevitably the consulting geologist and mining engineer who must pave the way if only because of the time lag of years between the initial exploration of a new mineralized area and the point where invitations to tender for plant and machinery are made. Yet in a sphere in which the Americans, the French, the Germans, the Russians and now the Japanese are ever-ready to supply directly or indirectly technical aid as an adjunct to foreign policy, Britain's mining consultancy resources in relation to the size of the problem are virtually nil outside of the legions in the National Coal Board and the numerous resident consultants retained by the big British overseas mining groups, neither of which groups have any incentive to provide consultancy services—probably at a sub-economic fee—in those underdeveloped countries where the British taxpayer rather than the British investor is probably helping to finance the development of new mines.

The Association therefore sees as one of its most urgent tasks the establishment of a close liaison with Whitehall and with financial institutions in the City as well as with foreign governments and international agencies upon whom depend the creation of new export opportunities, and it believes that it is essential in the national interest no less than in that of the mining machinery manufacturer that British consultancy know-how should be made readily available at the earliest stage in the consideration of all new exploration or mining projects. Needless to say it is not suggested that British mining consultancy is, or indeed should be, in any sense committed to particular manufacturing interests. Nevertheless it would be surprising if a British technical connection established through initial consultancy services did not carry over into a favourable situation being created for British mining machinery manufacturers as a whole without the consultant being in any way inhibited in his freedom of choice of individual plant and machinery.

The British Mining Equipment Export Association is still at a very early stage in its development and has clearly a long way to go both in building up its membership and in establishing its connections before its usefulness can be assessed by the yardstick of practical experience. There can, however, be no possible doubt that what it is seeking to do needs to be done. Whether or not it succeeds in its objectives will largely depend on the support which it receives from manufacturers.

AFRICAN PARTICIPATION AT BOARD LEVEL

At this critical period in African history, European observers are perhaps inclined to be so preoccupied with the more alarming birth pangs of some of the emergent nations, as to take insufficient account of the marked contrast which so often exists between the more extreme utterances of African leaders and the wisdom and moderation so frequently dis-

played by the same politicians where matters of economic policy are concerned.

This is particularly true of Ghana, where one of the cardinal aims of government policy is to create an atmosphere of internal stability which, in conjunction with favourable conditions for foreign investors, will attract the immense influx of overseas capital required for the country's ambitious programme of economic development. Mr. Alfred Teschen, a member of the U.S. trade mission which recently visited West Africa, stated in New York last week that Ghana would become one of the world's foremost producers of bauxite, aluminium and hydro-electric power. Approximately 300 new industrial projects have been planned, the most spectacular being the huge Volta River scheme now approaching finality. The proposed republican constitution provides safeguards for those who back faith with cash and the programme of internal development is accompanied by attractive terms and conditions for the outside help which is required.

Particularly encouraging are the happy relations which have been established between the Ghana Government and the British overseas mining companies. Since March, 1957, when it came to power, the government has given much practical and constructive assistance to the mining industry, as exemplified by the two generous and interest-free loans, totalling £600,000, to the marginal mines, Amalgamated Banket Areas and Bremang.

The industry on its part has sought to identify itself still more closely with the economic and social advancement of Ghana by wholeheartedly following a policy of Africanization. The extent to which this can be carried out must of necessity be governed by the speed with which Africans can be trained for technical and administrative jobs. Every incentive is being offered, however, by means of scholarships at various levels, internal training, and courses to accelerate the initial processes. In January this year the Chamber of Mines inaugurated a special Mines Training Scheme at the Tarkwa Technical Institute, for which the member-companies have made a grant of £25,000, to cover, initially, five years. The course is a three-year one and the Ghana Government is implementing the Chamber's grant.

The most notable development, however, which has resulted from the concept of partnership between Ghana and the gold mining industry is the recent appointment of an African, Mr. Tachie-Menson, as a director of two companies in the Western Selection group, namely, Ariston and Ghana Main Reef. Mr. Tachie-Menson has had a distinguished career in Ghana as Councillor, Sekondi-Takoradi Town Council, 1936-49; Municipal Member, Legislative Council, for Sekondi, 1944; Member, Executive Council, 1946-51; Member of several Public Committees; Director of West African Airways Corporation, 1946-52; Ghana Industrial Development Board, 1948-1951; Member, Coussey Constitutional Committee; Member, Public Service Commission, 1951-56; Chairman, 1957; Chairman, Achimota Constitutional Conference. His appointment to the Executive Council was a very high honour indeed for an African at that time, the Council consisting of the Governor, the Colonial Secretary, and the three Chief Commissioners.

Mr. Tachie-Menson also had the distinction of being the first elected General President of the Ghana Trade Union Congress, and he is well known all over Ghana as the District Grand Master of Ghana and P.G.D. of the Masonic Order.

Other considerations apart, it is evident that the new director will be a valuable accession to the boards of both companies, more especially since there could be nobody better qualified to advise them on all aspects of labour relations and government policy. Additionally, this appointment is, of course, a most impressive indication of the esteem in which the mining companies are held by the people of Ghana, and it will further strengthen the goodwill which is an asset of such incalculable value to the industry.

From the standpoint of public relations and goodwill, a strong case can obviously be made out for the appointment of an African to the board of an overseas mining company operating in an independent African territory, always provided that a man of the requisite calibre is available for the position. Not all the emergent countries, however, have reached the same stage of development and in the less advanced nations few Africans, no matter how promising their natural aptitudes, have the training and experience which would fit them for an appointment at board level. Moreover, with very few exceptions indeed, those Africans whose qualities and qualifications are such that they could be appointed directors on their own merits, are already making such invaluable contributions in other fields and capacities to the economic or political development of their country, that they could not readily be replaced.

These considerations could scarcely be overlooked by companies operating in territories where facilities for technical training and opportunities for acquiring administrative experience have only recently become available for Africans to any great extent.

AUTOMATION IN UNDERGROUND TRAFFIC CONTROL

At the end of March a new administration building with modern working facilities for a staff of some 600 was inaugurated at the iron ore city of Kiruna in Arctic Sweden. The completion of this building marks yet another stage in a large investment scheme carried out since 1951 by the LKAB Company, as from 1957 fully owned by the Swedish Government.

This plan has reputedly entailed an annual expenditure of some Kr. 100,000,000 (£6,900,000) and is expected to be concluded in 1965. It is anticipated that the annual mining capacity will have risen by then to 20,000,000 tonnes of iron ore, which compares with about 13,000,000 tonnes in 1959.

The first stage in the programme was the extension and modernization of the storage and shipping facilities at the Norwegian port of Narvik, main outlet for the ore. The next one was building a new big dressing plant for the enlarged mining capacity resulting from the switching over from openpit mining to underground mining.

At the same time a continued programme for expanding the haulage capacity of the ore railway and the rolling stock has been in progress. Furthermore, a plan for further extension of shipping facilities at the Port of Luleå in the northern part of the Gulf of Bothnia and another one for building a new port at the Rombakksbotten Gulf, north of Narvik, are under consideration. The latter presents some interesting contemplated aspects of utilizing the natural fall of the mountain side to achieve economies of transportation and loading.

An interesting new system of CTC traffic direction at the underground mining levels was demonstrated in connection with the inauguration of the new 13-storey office building. Located at a depth of 320 m. (1,000 ft.), the automatic system, complemented by a computer and known as the Transport Brain, is said to be unique in the world. It has cost some Kr. 3,000,000 (£207,000). Among the tasks of the versatile traffic-direction system are directing the trains from the loading pockets to the crushing machines, switching and locking the points, and supplying red or green signals worked out by means of stored information on quantities and qualities loaded. Within a second the trains are guided to the most suitable unloading site. Improved safety, as well as saving in time, will result. Under peak traffic conditions the 10-mile long rail system will direct 16 electrically operated trains, each loading 200 tons of ore.

Bikita—I

Mining



THE mineralized area known as Bikita Tinfields, which is situated in Southern Rhodesia 45 miles east of Fort Victoria just north of the main Umtali road, was discovered by Mr. H. Koestlick in 1910. From 1916 to 1950, 221 tons of cassiterite concentrates and 96 tons of tantalum concentrates were produced by small-workers.

In 1951 and 1952 the district became an important producer of beryl. At this time, the claims on the tinfields were being actively exploited by Mr. D. Lawrie and Mr. G. H. Nolan. Following the publication by Mr. R. Tyndale-Biscoe in 1951 of a geological memoir, Bikita Minerals (Pvt.) Ltd. was formed in 1952 and eventually purchased the claims being worked by Mr. Lawrie. Up to the end of 1958, 326,000 tons of lithium ores and 382 tons of beryl had been produced from the company's claims only.

Since this article was written Bikita Minerals has purchased the Al Hayat claims from Mr. Nolan, but the following description of operations concerns the Bikita claims only, where lepidolite is the major product. Selection Trust are the principal shareholders and technical managers of Bikita Minerals, the other major shareholders in the business being American Metal Climax, Inc., and American Potash & Chemical Corporation.

Geology

Briefly, all the economic minerals are found in large greisenized pegmatite bodies situated in the Greenstone Series, comprising rocks varying from massive epidiorites to foliated hornblende schists. The origin of the pegmatites is presumed to be granodiorite which borders the schist belt and which is also the source of the scheelite-bearing veins occurring to the east of the pegmatites.

The pegmatite bodies are tabular in form and strike roughly north-south dipping at angles varying from nearly horizontal up to 60° in an easterly direction.

The largest and most extensively worked of the pegmatites is that which traverses the Bikita and Al Hayat claims; on the Al Hayat claims the economic minerals are petalite with smaller amounts of spodumene, eucryptite, tantalite and beryl, whereas on the Bikita claims, the main mineral produced is lepidolite with smaller amounts of spodumene, amblygonite, petalite, pollucite, cassiterite and beryl.

Reference to the geological cross-sections shows that lepidolite forms the central core of the pegmatite and is overlaid by the "white minerals" zone containing spodumene, petalite, and amblygonite. Over this again is the hanging-wall beryl zone and finally a thin band of muscovite which is usually very near the greenstone contact.

Under the central lepidolite core is the so-called "cobbled zone" which consists of a matrix of felspar partly replaced

by lepidolite in the shape of spherical masses of various sizes. Under the cobbled zone is the footwall beryl zone which normally extends up to or near the footwall greenstone contact.

Other pegmatite bodies occur on the company's northern claims at Ndara and Nigel and were extensively worked for tin and tantalum in the past and more recently for beryl and lepidolite.

Extensive surface deposits of eluvial lepidolite occur on the footwall side of the pegmatite and isolated patches on the hanging-wall side.

Exploration and Development

As is usual with pegmatites, the evaluation of the orebody was a difficult task and meticulous care was taken in the early stages to ensure that the most detailed and accurate information was obtained from sampling and geological mapping.

Surface trenches across the orebody at 100 ft. intervals were cut over a strike length of 2,000 ft. Each trench was groove-sampled in 10 ft. sections and pickability tests as well as assays of the various portions were made.

Simultaneously with the surface work, underground development was started on the first level, about 100 ft. below surface, and three crosscuts traversing the body from hanging-wall to footwall were driven. This level was eventually connected to an adit from the footwall side for access, drainage and haulage and extended by means of a drive along the central core of the pegmatite parallel to the strike with crosscuts at 200 ft. intervals on the footwall side to develop the beryl footwall zone and at 100 ft. intervals on the hanging-wall side to develop the lithium, caesium and beryl hanging-wall zones.

Two further levels were laid out at 50 ft. and 100 ft. depths respectively, below the Shallow Adit. The deeper of these two was driven from the footwall side by means of an adit (Deep Adit) and is the present bottom level of the mine and it serves as a main haulage for the transport of ore to the plant.

A considerable footage of diamond drilling both from surface and underground has been done to test for the downward extension of lithium-bearing ore and a programme of prospecting by means of pits and trenches over the company's claims is still in progress.

As the project was intended to be a hand-picking operation in the first stage, it was necessary to distinguish very carefully between crude ore which could be beneficiated up to market requirements by picking methods and that which could not be so treated. Consequently, pickability tests were devised in respect of four main types of lepidolite, viz., solid lepidolite, cobbled lepidolite, eluvial lepidolite and old dumps so as to yield an ore reserve valuation of clean lepidolite recoverable with appropriate grade expressed in percentage Li₂O for each category of ore. Similar work was carried out in respect of the other minerals—amblygonite, spodumene, petalite and pollucite.

Considerable time and expense were expended on the geological and sampling work and detailed mapping of all exposures, underground and surface, was used as a basis for correlation between surface and underground phenomena and between level and underground. The data provided by this work were in turn used for the computation of ore reserves.

ngat **Bikita**

This article, by R. Symons, B.Sc., A.R.S.M., M.I.M.M., manager, Bikita Minerals (Pvt) Ltd., is the first of two instalments reproduced from 'The Chamber of Mines Journal', Dec. 1959. Illustrations show mining operations at Bikita

All sampling and the reduction of samples for pickability tests and assaying are done under constant European supervision. As a general rule, it is necessary to take large samples. For example, underground beryl samples are taken by blasting down the entire sidewall from roof to floor over a 5 ft. length; alternatively, if a current development end requires sampling for beryl, bulk sampling is carried out by taking every tenth shovelful of development spoil. Beryl samples frequently weigh as much as 1½ tons. Lithium samples do not require to be so large; a wide channel sample (about 18 in.) blasted over a length of 5 ft. along the sidewall at waist height, provides sufficient material.

All assaying is done by a firm of assayers in Johannesburg. Duplicates of all pulp sent for assay are kept at the mine and with every batch, a synthetic pulp, consisting of all the major mineral constituents of the pegmatite mixed together in controlled proportions, is sent as a dummy. The reported assay results are then adjusted to the same proportion as the dummy deviates from the known standard assay.

Recently, the prototype of a new instrument for the determination of beryllium values has been tested at Bikita. This instrument is called a "berylometer" and works on the principle that the emission of gamma-rays from an isotope of antimony Sb_{124} causes atoms of Be to throw off fast neutrons which, after being suitably slowed down, can be counted on a detector. Beryllium is the only element which will react in this way.

Two forms of the instrument have been tested to date. It has been established that a probable error in determination of only 0.005 per cent BeO can be expected with the large machine, which is permanently built on concrete; the portable form has not the same order of accuracy but has great possibilities as a rapid detector and rough evaluator of Be values *in situ* on surface or underground.

Marketing and Shipping

With the exception of small quantities sold to a local firm producing lithium salts the marketing of Bikita's products is carried out by American Potash & Chemical Corporation and its subsidiary Borax & Chemicals Limited. The biggest consumer is the U.S. but consignments to England, Holland, France, Germany and Japan, are regularly made. An associated company, American Lithium Chemicals Inc., operates a large plant for producing lithium salts in San Antonio, Texas; potash and other salts are also produced from the same plant.

All ore is exported via Beira. The company has a large area on the wharf and the chemical grade lepidolite is stockpiled there and shipped to the U.S. in chartered ships of about 10,000 tons per shipload. Glassmakers' grade lepidolite

and the other minerals produced are stockpiled in a private yard away from the wharf area. The greatest care is taken to ensure that no contamination takes place, all railway trucks are hammered, brushed and washed before use and the quay-side and ships' holds specially cleaned and inspected before loading is permitted.

Mining

All mining is done opencast but the ore is dropped down through orepasses equipped with 22 in. grizzlies to the Deep Adit, whence it is trammed in 4 ton side-discharge hoppers running on a 2 ft. 6 in. track and hauled by 9 ton Simplex diesel locomotives to the treatment plant over a distance of about 7,000 ft.

Initially, a transverse slot 25 ft. wide was cut across the orebody from footwall to hanging-wall in about the middle of the solid lepidolite outcrop. This gave a face about 50 ft. maximum height on either side and also provided a point of attack for overburden removal.

Simultaneously, smaller quarries were opened at approximately 400 ft. north and 400 ft. south of the main quarry at the same elevation and, at the highest point of the outcrop, 200 ft. south of the main quarry, a small quarry at an elevation 50 ft. higher. All these quarries were equipped with orepasses delivering to the Shallow Adit, whence the ore was trammed in 1 ton cocopans by 3 ton diesel locomotives to the temporary picking plant.

When the permanent picking plant was commissioned early in 1956 all the output from the quarries was passed down to Deep Adit level but, prior to that, the lepidolite was rough-sorted on the quarry floors, the rejects being dumped for further treatment.

The ratio of overburden to crude ore is approximately 1 : 1. The overburden consists partly of greenstone and partly of low-grade lithium minerals, felspar, quartz and mica. Greenstone overburden is carefully segregated from the other minerals and dumped separately as the latter would form suitable feed for a possible flotation plant, at some future date. During the mining of overburden, concentrations of spodumene, amblygonite, petalite and, to a minor degree, beryl and cassiterite which are recoverable by hand-picking are separated out in the quarry and transported to the appropriate picking floors.

All the quarries have now been interconnected into one large excavation with two incline roads for rock haulage. Down to the depth at present reached, the quarry is divided into three main benches each of 50 ft. vertical height and each of these is sub-divided into working benches of 25 ft. faces which is the maximum digging height of a 22 RB excavator.



TARGETS FOR CANADIAN PROSPECTORS

IN 1950 the cost of exploration conducted by metal mining companies in Canada was \$5,354,000; it increased in 1956 to \$48,400,000 and in 1957 to \$54,424,000, but dropped in 1958 to \$32,500,000. These figures are extracted from the *Canadian Mining Journal*, whose issue of April 1960 was devoted largely to the annual convention of the Prospectors and Developers Association at Toronto. They were cited by a Montreal mining executive, Mr. R. P. Mills, in answer to a question as to whether Canadian exploration was worth the effort. Mr. Mills went on to point out that the value of Canadian mineral production was \$1,045,000,000 in 1950, increasing to \$1,795,000,000 in 1955 and to \$2,389,000,000 in 1959. The value of metallics increased from \$617,200,000 in 1950 to \$1,007,000,000 in 1955 and \$1,359,000,000 in 1959. In other words, the total mineral production in 1959 was 2½ times that of 1950, while the value of metallics increased in the same ratio.

Canadian reserves of most minerals are now sufficient to maintain present and anticipated rates of production for many years. According to Mr. E. R. E. Carter, managing director of Patino of Canada Ltd., known reserves will last 100 years for iron ore, 75 years for nickel, 50 years for asbestos, lead and zinc, and 45 years for copper.

Pattern of Future Usage

Copper, gold, zinc and lead, which for many years were the core of the industry, are expected to decline in relative importance as nickel, iron ore and aluminium assume the leadership. Mr. Carter forecasts that iron ore will show the greatest increase in volume with a five-fold to six-fold expansion; the output of aluminium plants may rise by four times; nickel production may triple; zinc production will double; copper and lead production will increase by two-thirds and one-half respectively; asbestos will more than double; gold will remain important but production will decline in both volume and value unless the price is increased; magnesium and titanium have bright possibilities; silver, mined principally as a by-product of base metal operations, will expand by one-half; platinum, tungsten, molybdenum, lithium, columbium and thorium will make a significant contribution; and there will be expanded output of non-metallic minerals, particularly potash, of which Canada has substantial reserves.

Asked what were the metals and minerals on which prospectors should be concentrating today, Mr. C. J. Sullivan, president of Kennco Exploration, criticised the expenditure of such a large proportion of prospecting activities on the search for copper, lead and zinc associated with the massive sulphide deposits in the Canadian Shield. He suggested that the Shields of the world were also extremely rich in iron, titanium, beryllium, uranium, and other oxide- and silicate-forming metals, but were not really rich in the comparatively low-temperature metals which form sulphides, apart, of course, from nickel. In his view prospectors should perhaps concentrate more on some of the disseminated deposits.

As to which metals were likely to be most needed, Mr. Carter pointed out that during recent years steel production in Western Europe alone for the first time in about a century had started to exceed that of the United States. This vast production of steel, together with the industrialization of the world would call for much alloying material. Molybdenum, cobalt, vanadium and tungsten might be some of the best bets for the near future, and provinces outside the Shield would bear a much closer look.

Prospectors were also advised to go out and look for what Mr. R. J. Lund, assistant technical director of Battelle Memorial Institute, termed the "exotic metals". In an illuminating study of potential mineral demand, Mr. Lund pointed out that four major factors largely control the longer range picture—population, living standards, technology and price. All four must be considered carefully in studies of future markets, but the weights given to each will vary substantially among different materials. For example, population and living standards will be weighted heavily in basic materials such as steel, salt and potash, whereas technology will be the overwhelming consideration for what might be termed specialty metals, such as beryllium, columbium, tantalum, lithium, rare earths, titanium, zirconium and uranium.

The "Exotic" Metals

Battelle considers that beryllium has excellent growth potentials if (1) large deposits can be found and methods can be perfected for mechanical or chemical separation of the metal-bearing mineral from gangue (replacing present hand-cobbing methods); (2) progress made in fabricability of the metal can be successfully continued; and (3) toxicity problems in metallurgical processing are not a deterrent. Accomplishment of these aims would have to be held within reasonable limits of price and cost.

Interest in boron's future as an exotic fuel or propellant appears to be waning, but even if such development occurred its impact on the total demand picture would only be minor. Potentials for use of the high purity metal in atomic energy and semi-conductor applications depend on the outcome of research. In the case of caesium, Mr. Lund pointed out that it would still be a long time before space travel included weekly trips to Mars or even the moon, so that any sizeable growth in demand in the next five or ten years would depend mainly on thermionic developments. Columbium's growth is still dependent on the outcome of present and future research, and on the nature of future military plans and procurement programmes. Mr. Lund considered, however, that an increase in total Cb usage of from five to ten times the present level might be expected in a period of from five to ten years.

The existence of so much surplus productive capacity for lithium processing should spur research on new and expanded civilian uses, especially if prices could be further lowered. Thorium's usage in magnesium alloys looks strong, but its big use potential in thermal breeder nuclear reactors must await further trials under the long-range Thermal Breeder Reactor Programme announced last summer by A.E.C. Rhenium was described as a really good growth metal if more abundant sources could be found. Interest in tellurium for its semi-conductor properties is reaching the stage where some estimates of potential demand are well ahead of total current production. Telluride ores in the future may well constitute premium types.

Battelle looks for "modest" increases of 5 to 10 per cent per year in titanium usage, with civilian uses in highly corrosive marine and chemical plant environments accounting for expanding shares of the total market. Similarly, only a "modest" increase in demand over the next five to 10 years is foreseen for zirconium and hafnium.

Mrs. MacMillan, in her presidential address to the convention, made a plea for the "forgotten metals", and suggested that this year's theme for the convention might well be: "Let's get out and look into the possibilities of both gold and silver".

Lead-Zinc Study Group—I

THE INTERNATIONAL LEAD AND ZINC STUDY GROUP

THE Lead and Zinc Study Group is very young. Some of its activities have hardly begun. Yet this new organization already has influence in the lead and zinc industries throughout the world. The Group is not only recognized; it is even given credit for some substantial changes which have come about during the past year in the tenor and outlook of international trade in lead and zinc. Because of the relationships between domestic and international markets, the Study Group can be important, not only to importers and exporters but to all producers, consumers, and merchants of these materials.

Strictly speaking, the curtailments of international supplies which were in effect during 1959 should not be attributed to the Study Group. Those curtailments, and the Study Group itself, were the separate, joint products of the preceding exploratory conferences and an interim committee. The Study Group, however, has become the continuing machinery. It is naturally now thought of as an extension of the international discussions which began before it was organized.

Functions and Procedure

The Study Group is an autonomous intergovernmental body. The members are national governments. Membership is open to any government which is a member of the United Nations, or of its specialized agencies, or is a Contracting Party to the General Agreement on Tariffs and Trade if the government considers itself substantially interested in the production, consumption or trade of lead or zinc. Twenty-five governments have accepted membership. All continents are represented. The member countries account for more than 90 per cent of estimated world production, consumption, and trade of lead and zinc, ore and metal.

The members participate in sessions of the Study Group through national delegations which include officials of government and representatives of industry. Industry representatives have already contributed a great deal to the work. It is hoped and believed that their participation can be further increased.

The Study Group has its own rules of procedure. Its terms of reference permit considerable flexibility in operations. There is no fixed schedule of meetings. These are held at times and places decided by the members according to circumstances. The normal procedure is for the discussions in the Study Group to be held in private, and for the decisions of the Group to be taken according to the sense of the meeting, without voting. The Group is authorized to make studies; arrange for statistics; consider possible solutions to special difficulties; and submit to member governments reports, which may include suggestions or recommendations.

The Group has no regulatory authority. Membership involves no obligation upon a government as regards the production, consumption, or trade of its country. The Group is to remain in existence as long as the participating governments think it useful. A member government is free to withdraw at any time. For the present, a small office and staff in New York are being provided by the United Nations on a reimbursable basis. The budget for 1960 is very modest. Part

This is the first of two extracts from a paper presented at a joint session of the American Zinc Institute and Lead Industries Association on April 7, 1960, by C. W. Nichols, special assistant, Office of the Assistant Secretary for Economic Affairs, U.S. Department of State

of the expenses are being shared equally by the member governments; the remainder being allocated among members in proportion to their volume of international trade, taking account of exports and imports. The size and functions of the headquarters staff are presently at a minimum. These could be expanded if the members desired in time to establish statistical or publications programmes as other study groups have done. The present disposition of the Lead and Zinc Group is to rely upon existing sources of statistics as far as possible, but to exert an influence toward improvement and extension of existing statistical work.

As long as the operations of the Study Group are related so closely to the United Nations, the meetings of the Group will probably be at New York or Geneva, since those are the locations where the UN maintains conference facilities. The Study Group could meet elsewhere, especially if a member government should extend an invitation to host a particular session. This has been a common practice of other commodity study groups. The next full session of the Lead and Zinc Study Group is expected to be in early September of this year, probably in Geneva, but a definite decision has not yet been taken concerning either the date or the place.

The Study Group has established a Standing Committee to deal with matters requiring attention between full sessions. The Standing Committee manages the budget; directs the secretariat; keeps the lead and zinc situation under review; and makes plans for future meetings of the full Group. The Standing Committee includes all members of the Group who wish to participate in its work. This Committee elects its own officers. The officers of the Standing Committee are expected normally to be the same individuals, or in part the same individuals, who are at the time holding offices of the Study Group to which they have been elected at full meetings. The Study Group currently elects its own officers for a term of one year, which may be extended until successors have taken office.

The Group has appointed a small panel of persons who are specially qualified in the field of statistics to consider the data now available concerning lead and zinc on a world basis, and the improvements which might be made in this data. This panel will report to the Standing Committee before the next Study Group meeting.

Commodity Stabilization

The newly organized Study Group comes on a stage which already had a giant backdrop of world concern with the problems and interests involved in international trade of primary commodities. Nationalism is a strong force in the commodity field, but there is also an increasing recognition, especially since the second world war, of the interdependence

among nations in a world situation. As governments have taken greater responsibilities for economic affairs, the commodity policies of individual governments have created for these governments a set of new and more active relationships with private companies and other governments.

The waste and distress that can be caused by extreme economic cycles and excessive fluctuations in the prices of major commodities have become an ever more pressing concern as stronger emphasis is placed on the maintenance of high levels of productive employment and a steady economic development at home and abroad. Great efforts are made to encourage a flow of private and public capital into less industrialized countries, but this international investment and its broad objectives can be seriously undermined in many of those countries if their earnings on the commodities they export do not show long-term growth with reasonable stability along the way.

Direct and detailed controls for purposes of stabilization have been undertaken in some commodities. The record of peacetime regulation has not been too impressive, either on a national or an international scale. But the world is in no mood to embrace fatalism. People are not inclined, either in the United States or in other countries, to regard the hardships of extreme price fluctuations as an affliction which is unavoidable. Severe instability in external markets can increase greatly the problems which national governments face in pursuing liberal policies toward international trade.

These problems of primary commodities have engaged and continue to engage the serious attention of many international bodies. No panaceas have been discovered, but most governments place a high priority on a continuing search for ways to moderate instability and reduce the causes of international friction. The General Assembly of the United Nations has repeatedly discussed the objectives toward which international cooperation should be directed in the field of commodity problems. So have the Economic and Social Council, the Food and Agriculture Organization, and the Organization of American States. The Commission on International Commodity Trade was established for this purpose. Commodity problems have been emphasized in the sessions of the Contracting Parties to the General Agreement on Tariffs and Trade. None of these general organizations, however, has been able to devote continuing attention in depth to any particular commodity situation.

A few commodities, notably wheat, sugar, and tin, are subject to specific intergovernmental agreements. Each of these agreements is administered by an international council which, of course, is not concerned directly with any other commodity. The functions of those councils are quite different from those of the commodity study groups.

Some commodities have received much more intergovernmental attention than others. The amount of international trade is not in itself the controlling factor. Each of the leading world commodities has some special characteristics which affect the interests of governments and the methods they think desirable for pursuing those interests. Some commodity study groups have been formed in response to an immediate, more or less fortuitous, situation. Study groups have only endured, however, and proved to have continuing usefulness, in those commodities where a considerable number of importing and exporting countries found continuing reason to keep developments under joint review.

A happy situation in a world commodity presumably would be one in which there were not enough uncertainties or problems for governments to attach much importance to a study group. Where the commodity is sufficiently important, however, and the need for a study group is felt sufficiently widely, these practical considerations are usually controlling rather than any theory about the desirability of study groups in principle.

Pittsburgh

COAL is transported by pipeline over a distance of 108 miles from the Cadiz Mines of Pittsburgh Consolidated Coal Co. to a thermal power station belonging to Cleveland Electric Illuminating Co. at Eastlake, near Cleveland, Ohio. (vide *The Mining Journal*, Aug. 29, 1958, p.219 and May 30, 1958, p.636.) This is the longest pipeline for carrying solids which has yet been built.

Culminating ten years of planning, research and development, this system is now in full operation. It is scheduled to deliver 18,000,000 tons of coal, at a rate of about 1,250,000 tons a year, over 15 years. The need for its development stemmed from rising costs of transportation which for longer hauls doubled, or more than doubled, the pit-head cost of the coal. Having, in its coal cleaning plant, already adopted the coal-water slurry method of processing, Pitts-

Consolidated

burgh Consolidated decided to carry this practice a stage further from the large Georgetown coal cleaning plant, which serves the many mines of its Hanna Coal Division in the Cadiz, Ohio area. Instead of the slurry being dewatered and dried immediately following cleaning, it was decided to investigate the possibilities of transporting the coal in slurry state and dewatering and drying it at the end of its pipeline journey.

To this end, a small closed circuit pilot plant was constructed which supported the feasibility of transporting coal in this way. This subsequently led to the construction, with the co-operation of the Cleveland Electric Illuminating Co., of a much larger \$2,000,000 pilot plant which would simulate pipeline conditions between Georgetown and Eastlake. This confirmed the mechanical aspect of the project and made possible further calculations as to the economics of the proposition.

The slurry preparation terminal at the Georgetown cleaning plant



As installed, this coal pipeline system consists of three major components: the slurry preparation terminal at the Georgetown cleaning plant; the pipeline proper, with pumping stations at Georgetown, Carrollton and Atwater; and the dewatering and drying terminal at Eastlake. About 80 per cent of the coal delivered by the system consists of fines from the Deister tables, the clean slurry from these tables being pumped to the preparation plant for the pipeline. Water for coal suspension in the line is obtained from an existing lake which has been increased in size by raising the height of the impounding dam.

As the fine coal is pumped from the cleaning plant it is delivered on to screens which pass sizes suitable for the pipeline slurry into a drag tank, the oversize coal being taken either to a crusher where it is reduced to suitable dimensions, or to a storage pile. The product from the crusher can also be delivered either to the drag tank or to a storage pond. To make up the 20 per cent pipeline requirements not provided from the Deister tables, run-of-mine coal is crushed and re-crushed before being sent to the sizing screens, all of whose product is of 14 mesh or minus size.

Three storage ponds are provided for pipeline coal in excess of immediate requirements. One takes overflow fines from the drag tanks, a second is for excess product from the drag tank discharge, while the third is for storage of the oversize pieces from the screens. By thus keeping the different sizes apart, subsequent segregation is kept to a minimum and oversize pieces can be reduced separately. Furthermore, the different sizes can be recombined in the same ratio as existed in the feed to the tank. Also, by making use of the storage ponds, the pipeline can be kept in continuous operation when the cleaning plant is out of service. Thus, although the pipeline demand is only 150 tons per hour, the preparation plant has been designed for a throughput of 300 tons per hour. To ensure proper slurry concentration by weight on a 50-50 coal-water basis, the discharge from the drag tanks is processed in a mixer where the mix is automatically measured and the correct quantities of water added. From the mixer, the slurry is pumped to the suction sides of the pumps in the first of the stations on the delivery pipeline.

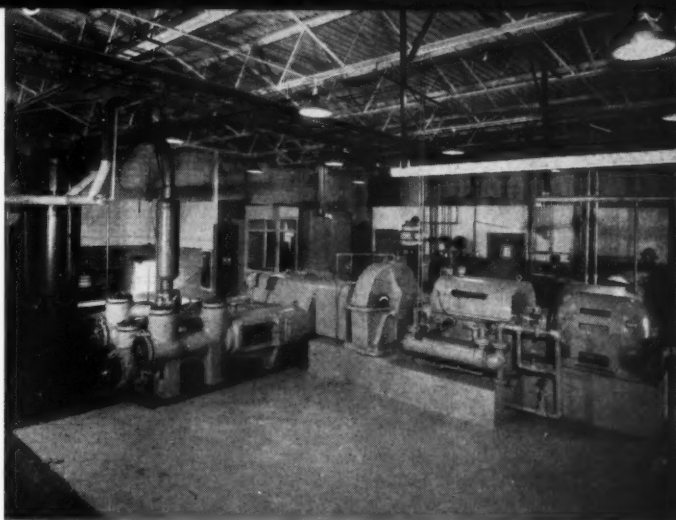
At each of the three pumping stations on the line, three Wilson-Snyder reciprocating pumps, driven by 450 h.p.

Sends Coal

squirrel-cage motors through hydraulic couplings and a speed reducer, have been installed. Two pumps are sufficient to meet the pipeline requirements and are normally in use. The third acts as standby. Each pump can deliver about 530 gallons per minute of slurry at a possible pressure of 1,000 lb. p.s.i.g. This quantity is made up of 306 parts by volume of water and 224 parts of coal. The discharge from the two operating pumps is delivered into a single surge tank which feeds directly into the pipeline.

At the two booster pumping stations on the line, emergency supplies of water, taken from wells at the site, will be held in a reservoir and a second empty reservoir will be available for the emergency dumping of the pipeline slurry.

Pump wear is automatically compensated for by hydraulic coupling, and servicing of any pump is carried out when its volumetric efficiency drops below 80 per cent. Maintenance is, however, facilitated by the layout of the plant and by the use of pumps which can be easily dismantled and re-assembled. Should either of the booster stations suffer power failure, that particular station can be by-passed and the additional load taken, for the time being, by its preceding station.



Interior of one of the pumping stations on the Georgetown-Eastlake pipeline

Totally buried below the frost line, the pipeline consists of a single channel, of 10½ in. outside diameter, made of steel with welded joints. The wall thickness of the pipe varies with the pressure to be coped with and this, in turn, depends on distance from the pumping station. The maximum thickness used is 0.7 in. while in order to prevent the solids in the slurry from slipping back despite the continued onward flow of the liquid, the maximum inclination of the line up hills has been fixed at 10 degrees.

Normally, the speed of flow of the slurry is about 4.5 ft. per sec. Should this drop to zero through pumping failure, however, it is not expected to cause serious inconvenience. The coal in the slurry is expected to drop to the bottom of the pipe without compacting and, on restart, the partial blocking of the line by the coal is expected to produce eddies in the flow which will have the effect of reconstituting the slurry.

Some erosion of the pipe is expected to take place, but this will be reduced to a minimum by the relative freedom of the coal from ash and silt, the greasy nature of the coal itself and the gradual wearing-off of the sharp corners of the coal leaving rounded particles which will be less damaging in their erosive effect. Despite the reduced wear expected a 20 year wear thickness was added to that required to meet the safety and pressure factors.

Normal exterior corrosion protection has been given to the pipe and to this will be added cathodic protection. To reduce interior corrosion, caustic is being added to the slurry to neutralise the possible acid solution resulting from sulphur compounds leached from the coal and a minimum pH value of 6½ is aimed at. The action of oxygen dissolved in the suspension water will be arrested by an inhibitor while nitrogen is also used in the surge tank heads. These treatments are being administered at each of the three pumping stations.

At the end of its pipeline journey, the slurry is delivered into large 90 ft. Dorr thickeners where the process of dewatering the coal is begun. This is continued in vacuum filters and completed in thermal flash dryers. This drying process is accompanied by special operations to prevent air pollution and to clarify the water, which, when finally discharged into Lake Erie, is claimed to be much purer than the lake water.

The pipeline will furnish about 80 per cent of the coal required by the Eastlake power plant of the Cleveland Electric Illuminating Company, which has an aggregate capacity of 660,000 kW. Its use was expected to show a saving of over \$3.30 per ton in relation to the c.i.f. price for railborne coal delivered from the Georgetown cleaning plant to Eastlake.

by Pipeline

Technical Briefs

Ion Flotation

Wins Metals

From Solution

A patent application has been made in the U.S. and 31 other countries by Armour and Co.'s Fatty Acid Div. on a new metallurgical process—ion flotation, a process that may pave the way for the recovery of non-ferrous metals from such solutions as mine waters and dilute leach liquors. The process was developed by Prof. Felix Sabba, Witwatersrand University, South Africa, and has been viewed in some quarters as a cheap way to win metals from the sea. It has been described in *Engineering and Mining Journal*, Vol. 160, No. 9.

Armour considers the sea water deal interesting, but is directing research toward mine water applications. Basically the process is the same as mineral flotation, except that no mineral is involved, only the metal ions in solution. Soap, with an affinity for certain metals or metal groups, is bubbled through the metal-bearing solution where the soap reacts with the metal ions to produce a water-insoluble heavy metal soap which floats to the surface and is skimmed off with other soap bubbles.

Armour hopes to find soaps that will be selective. Two approaches are open. One is to find selective hydrocarbon soap partners. The other is to take advantage of the electromotive series of metals.

For example, suppose that for economic reasons and availability, one chose stearate as the hydrocarbon partner and tried to form a soap selective to copper in mine water. Looking through the electromotive series it can be seen that a lithium soap would be useless, since lithium would react with every element in the table. Aluminium would be somewhat better since it would eliminate the alkali and the alkali earth metals; but it would still react with many undesirable in the series.

Lead, antimony and arsenic soaps would produce a much cleaner concentrate; but bismuth would appear the perfect soap, since it would react only with copper in acid mine water. One stumbling block in this approach is the relative insolubility of the heavy metal soaps in water. The reagent soaps could be dissolved and diluted and fed with an alcohol or mineral spirit or blended with a wetting agent that would remain soluble in the solution and not contaminate the product.

X-RAY FLUORESCENCE ANALYSIS

New x-ray tubes for x-ray fluorescence analysis in which the characteristic radiation from impurities in the tube anode is reduced to a very low intensity are now being produced by Machlett

Machlett OEG-60 beryllium window tube for research and fluorescence analysis



Laboratories Inc. The new x-ray tubes are available from Watson and Sons (Electro-Medical) Ltd.

The spurious characteristic radiation generated in x-ray tubes is one of the factors limiting the sensitivity of the x-ray fluorescence method. The new tubes allow an improvement in sensitivity to be obtained, especially for copper and nickel, and the effect of target impurities is now insignificant.

The improved x-ray tubes, designated AEG-50-S, OEG-50-S and OEG-60-S, have been developed from the well-known AEG-50, OEG-50 and OEG-60 types, with which they are interchangeable. The AEG-50-S and OEG-50-S tubes have 5 mm. x 5 mm. foci and are available with tungsten or platinum anodes. The OEG-60-S tube has a 6 mm. x 6 mm. focus and is available with tungsten, platinum and molybdenum anodes. All the new tubes have beryllium windows and operate up to 50 kV.

NEW FILTER MATERIAL

Experience gained in processes of sintering porous metals has been applied to the development of a technique by which sheets of woven wire gauze may be furnace-welded at all contact points. As a result, it is possible to produce a material having a porosity which can be strictly controlled during manufacture and maintained in service.

The technique is normally applied to stainless steel mesh, but other corrosion-resistant metals can be used. The sheet material has high strength and can be fabricated and welded to form filters of a wide variety of physical shapes. The structure is such that loose particles of filter material cannot become detached.

Filters of this material are very suitable for long service with corrosive liquids, and low temperature thermal insulation. It is manufactured by Sintered Products Ltd.

News in Brief

Johnson, Matthey and Co., Ltd., announce that they have adopted the name Silver Star to cover their entire range of precision silvered mica capacitors.

All the components produced in the future will bear a silver star as a final inspection mark, indicating that the capacitor has undergone four final inspection tests for capacitance, power factor, proof voltage and insulation resistance. The range covers a wide variety of sizes and finishes and all capacitance values up to 0.25 μ F. It includes the new type "H" capacitors that have been developed for operation at temperatures up to 250 deg. C.

Information on Silver Star capacitors is available in an entirely new series of data sheets. These data sheets, enclosed in a binder (publication 1460), together with a descriptive booklet (publication 1461), are available free on request from the company's head office at 73-83 Hatton Garden, London, E.C.1.

★

Denver Equipment Co. has issued a flowsheet study on the flotation of molybdenite from copper. The flowsheet illustrates the molybdenite section of a copper mill starting with the copper rougher flotation concentrate, conditioning and floating the molybdenum to make a molybdenum and copper separation, and then multiple cleaning and re-cleaning to produce a high-grade MOS₂ concentrate in excess of 90 per cent MOS₂.

This flowsheet study, designated as Bulletin No. M7-F66, will be sent by Denver Equipment Co. to any interested party.

The U.S. authorities have issued a preliminary list of export products on which tariff concessions may be requested from other countries at the GATT negotiations to be held at Geneva in September. Items on the export list include the ores, concentrates, scrap and semi-fabricated forms of aluminium; copper and copper-base alloys and nickel; cobalt, molybdenum, titanium, tungsten and products thereof. The import list includes aluminium scrap, metallic magnesium and the scrap, alloys, products, etc., thereof; bismuth, nickel silver in various forms, brass and bronze rods, sheets, etc., and nickel and alloys in various forms.

A \$765,000 contract for the construction of a 1,200 ft. deep shaft has been awarded by the U.S. Atomic Energy Commission to the American subsidiary company of the Cementation Group. The shaft will provide access to a driftage designed for the detonation of a nuclear device for the development of atomic energy for peaceful purposes. Known as "Project Gnome", the site is at a point 25 miles south-east of Carlsbad in the salt beds of New Mexico. In announcing the award of the contract, it was stated at the Cementation Group's head office in London that work would begin on the project within the next 10 days and was scheduled for completion by June, 1961.

In 1959, West German production of gold at 2,465 kg. rose by 10 per cent over the 1958 figure of 2,220 kg. Imports in 1959 were 43,750 kg. (45,270 in 1958), and total consumption was 42,828 kg. (44,482). Silver output also rose during 1959, reaching 375,050 (304,026) kg., an increase of 23.3 per cent. Imports were 954,709 kg. (957,992), and total consumption was 836,795 kg. (830,729). Platinum output at 26.9 kg. (24.9) showed an increase of 8 per cent. Despite an increase of 57.6 per cent in platinum consumption, from 1,462.9 to 2,306.8 kg. in 1959, imports fell from 4,378 to 2,790 kg.

The Goodyear HDNF conveyor belt ready for shipment



It is announced from the Republic of Ireland that private firms are to undertake prospecting for coal in areas in the County of Limerick and in Laois. Notice has been given by the Irish Ministry for Industry and Commerce that prospecting licences are to be granted to Sheehy Bros., Ltd., in respect of a number of townlands in the Loughill areas of Limerick, and to Rossmore Collieries for an area in Laois. The Loughill area is known to contain coalfields which were worked on a small scale 150 years ago, and the district in Laois is part of the Leinster coalfield.

On May 20, Mr. A. W. Browne, O.B.E., M.I.E.E., Chairman of The Chloride Electrical Storage Co. Ltd., officially opened the new Central Research and Development Laboratories of the Group at Clifton, Swinton, Manchester. The growth of its interests has naturally led to a considerable expansion in the company's activities. Included in the Chloride Group are now three large lead-acid accumulator factories in the United Kingdom and an alkaline battery factory. The company's activities have also spread widely overseas and manufacturing units have been established in almost all of the countries of the British Commonwealth. Among their products are included such world famous batteries as "Exide", "Chloride", "Dagenite", "Tudor" and "Kathode" lead-acid types and "Nife" and "Britannia" steel-alkaline batteries. With the growth of the interests at home and overseas, the need for a centralized research and development organization in which the longer term investigational problems hitherto undertaken by the separate manufacturing companies could be brought together, has become increasingly important, and new Central Research and Development Laboratories specially designed to meet the widespread requirements of the industry have been built and are now in full scale operation.

A 1,000 ft. Goodyear HDNF conveyor belt—containing heavy duty nylon fill fabric—is the biggest belt of this type built in the company's Industrial Products plant at Wolverhampton. Together with another belt of the same size (48 in. x 7 ply) it is being prepared for shipment to Pedro de Valdivia in the North of Chile. The belts have been ordered by the Nitrate Corporation of Chile Ltd., for the Cia. Salitrera Anglo-Lautaro's nitrate of soda producing plant at Pedro de Valdivia in the North of Chile. The installation, in the crushing section, comprises part of a 1,500 ft. conveyor system driven by a 250 h.p. motor at a speed of 510 ft. per minute. Caliche, a nitrate-bearing ore, is the material to be handled, being crushed and screened to 1½ in. fines at a rate of 1,700 tons per hour by a group of five 7 ft. Symons cone crushers. Each belt, weighing approximately ten tons, is constructed in 42 oz. HDNF fabric with ⅝ in. top cover, including nylon transverse breaker, and a 3/32 in. bottom cover.

MINING MISCELLANY

The Liberian - American - Swedish Minerals Co. announces the award of a \$40,000,000 contract to Raymond International of Liberia to build a 170-mile railway. The railway will run from Nimba, near the Guinea Republic border, to a new harbour being built at Bassa. It will carry nearly 30,000,000 tons of iron ore to the port for the world markets.

The two primary rolling mills built by Iscon in West Bengal, have now come into production on schedule at the Durgapur Steelworks. During the first day, 250 tons of ingots were rolled—an annual production rate of 800,000 tons of saleable rolled steel products is planned. The continuous mill, which will shortly come into operation, producing billets for re-rolling for India's secondary industries and for exports, is expected to effect substantial saving in India's foreign currency resources, which have already been assisted by Durgapur's first blast furnace production of over 100,000 tons of pig iron. With the addition of further coke ovens, a fourth blast furnace, more steel furnaces and slaking pits and finishing mills, the capacity of the plant will be raised to 1,600,000 ingot tons per annum. The layout at Durgapur has been planned for an eventual annual output of between 2,500,000 and 3,000,000 tons.

A concession for the exploitation of the Sierras Grandes iron ore deposits in Argentina was awarded to Minera Alumina S.A.I.C.F., and the Southern Cross Steel and Mining Co., by the Argentine Secretary of War. The contract has yet to be ratified by the National Executive.

What is claimed by Mr. Franc R. Joubin, president of Bralorne Pioneer Mines, to be the best-looking gold find in British Columbia since the 1930's, has been discovered by Mr. Ernest Howard, at Bridge River, about 100 miles due north of Vancouver. The mineralized zone so far has been exposed at irregular intervals for a distance of about 600 ft., with the gold content averaging about \$14 per ton across widths of 6½ to 9 ft.

Two research cruises organized by the Oceanographic Institute of New Zealand Department of Scientific and Industrial Research have been testing the sea-bed sediment between Wanganui and Kaipara Harbour, and have reported vast deposits of potentially valuable magnetite ore sands in the area. Japanese prospectors have also reported magnetite deposits at Waitara, north of New Plymouth.

It is reported from North Vietnam that a new plant for processing chromium ore, supplied and installed by China, has started operation, under Vietnamese management, at Ca Dinh, in the Province of Thanh Hoa.

Aluminium — Africa's Metal

The view that within three decades Africa may produce half the world's aluminium supply is expressed in the *Journal of Metals*, magazine of the Metallurgical Society of the American Institute of Mining, Metallurgical and Petroleum Engineers. The author is Mr. F. Weston Starratt editor of the publication, who stresses Africa's "almost unlimited deposits of bauxite and her enormous hydroelectric potential". Few places in the world, he states, appear to offer such vast deposits of high-grade bauxite in close proximity to an enormous, and almost completely untapped, hydroelectric potential. "Starting with French and Canadian activity in this area, almost the entire gamut of major European and North American aluminium firms have become actively interested in the continent's tremendous production possibilities." Emphasis is laid, however on the problem of social and political stabilization as a prerequisite of economic development.

With alumina shipments now under way from Guinea and aluminium in production at Cameroon, large-scale aluminium projects are being investigated in other regions, including Ghana, the Congo Republic, the Belgian Congo and Angola, as well as new sites in Guinea and Cameroon.

Mr. Starratt indicates that it may be 1965 before full-scale operation is achieved at Fria, in Guinea, where an immense alumina plant of 480,000 tonnes capacity a year is being constructed by an international consortium. The entire project, estimated to cost \$155,000,000, involves the construction of a 96-mile railway from Fria to the harbour at Conakry, which has been enlarged and developed for handling raw materials and alumina. Ships carrying Fria alumina to Europe return with raw materials, creating a low-cost two-way flow of materials through Conakry. The article indicates that it may be 1965 before full-scale operation in the area is achieved. The contemplated development of aluminium production in Guinea would require substantial capital, leading the author to note that: "Participation by the World Bank or a similar group appears to be a necessity. Such a participation would now appear to be dependent on a settling of political dust." A further observation is that financial assistance of "an international lending authority" may be required in connection with the Volta River project, which calls for a \$168,000,000 power operation to provide a potential of 512,000 kW.

The conclusion is reached that, from most points of view, the low cost power

schemes of the Congo Republic and the Belgian Congo appear closest to realization. At the same time, the author points out that the Volta River project apparently has something the other two do not have—adjacent bauxite deposits.

★

Alcoa is going ahead with its capital expenditures programme despite some "uncertainty" in the current overall business picture, states the president, Mr. Frank L. Magee. Major projects in the 1960 capital programme include work on the new 175,000-ton-per-year aluminium smelter at Warrick, Indiana. Its operations will include supplying molten aluminium for a General Motors Corp foundry at Bedford, Indiana. The first of Warrick's five potlines, with rated capacity to produce 35,000 tons a year, has already started operations.

Another key project is the development at Brokopondo, in Surinam, of an aluminium raw materials and manufacturing complex that will eventually cost Alcoa about \$150,000,000. Preliminary work started last year and construction of a dam, powerhouse and aluminium smelter is scheduled to begin this summer.

Alcoa still stands by an earlier estimate that consumption of aluminium in 1960 will run 10 per cent ahead of 1959 levels, but Mr. Magee points out that part of the consumption could involve the reduction of inventories, as a result of which an estimated 14 per cent of installed capacity in North American primary aluminium plants is currently idle.

Mr. Norman Manley, Premier of Jamaica, has announced that Alcoa plans to spend \$15,000,000 on the creation of port and harbour installations and on a bauxite industry in Clarendon Parish. Construction work will begin at the end of this year and mining in the middle of 1963. The company has mining rights for 30,000 acres.

★

The bauxite production of the EEC countries in 1959 amounted to 2,050,000 tonnes compared with 2,120,000,000 tonnes in 1959, according to the Statistics Office of the EEC. The main bauxite deposits of the EEC are in France and are estimated at 60,000,000-70,000,000 tonnes comprising 25,000,000 tonnes of proved and 35,000,000-40,000,000 tons of probable ore stocks. They are situated in the south-west of France. Italy's bauxite deposits—in the Central Apennines and in Apulia—are believed to total 10,000,000-15,000,000 tonnes. The only bauxite exporting country in the EEC is France, which exports some 700,000 tonnes annually, of which 50-60 per cent are shipped to West Germany.

AMOSITE AND BLUE ASBESTOS

The outlook for amosite and blue asbestos was discussed by Mr. Giles Newton in his statement for the annual meeting of the Cape Asbestos Co., to be held in London on June 10. Demand for amosite, it was stated, remained strong throughout the year, especially for the shorter grades. Mining targets have been consistently attained, and the development and layout of the mines may now be said to be generally satisfactory.

On the Blue fields, the main cause of concern has been the reduced demand for blue fibre, consequent on the excessive production of Canadian chrysotile,

LONDON METAL AND ORE PRICES, JUNE 2, 1960

METAL PRICES

Aluminium, 99.5%, £186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 6d. lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 12s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 250s. 8d.
Iridium, £23/£25 oz. nom.
Lanthanum (98%/99%) 15s. per gram.

Manganese Metal (96%/98%) £275/£285
Magnesium, 2s. 24d./2s. 3d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £22/£24 oz. nom.
Osmiridium, nom.
Palladium, imported, £8 12s. 6d.
Platinum U.K. and Empire Refined £30 5s.
Imported £28½/£28¾
Quicksilver, £70½/£70¾ ex-warehouse
Rhodium, £45/£48 oz.
Ruthenium, £16/£18 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 79½d. f. oz. spot and 79d. f'd
Tellurium, 21s. 6d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis 19s. 6d./21s. 6d. per unit, c.i.f.
Beryl (min. 10 per cent BeO) 230s./235s. per l. ton unit BeO
Bismuth 30% 5s. 0d. lb. c.i.f.
20% 3s. 3d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (semifriable 48%) (Ratio 3:1) £15 5s. 0d. per ton c.i.f.
" Hard Lumpy 45% (Ratio 3:1) £15 10s. 0d. per ton c.i.f.
" Refractory 40% £11 0s. 0d. per ton c.i.f.
" Smalls 44% (Ratio 3:1) £13 5s. 0d. per ton c.i.f.
Baluchistan 48% (Ratio 3:1) £11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides (Ratio 10:1) Nb₂O₅ : Ta₂O₅ 175s./180s. per l. ton unit c.i.f.
Fluorapat—
Acid Grade, Flotated Material £22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF₂) 156s. 0d. ex. works
Lithium Ore—
Petalite min. 34% Li₂O 47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 34% Li₂O 47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li₂O 75s./85s. per ton f.o.b. Beira
Magnesite, ground calcined £28 0s./£30 0s. d/d
Magnesite Raw (ground) £21 0s./£23 0s. d/d
Manganese Ore Indian—
Europe (46%-48%) basis 67s. 6d. freight 73d./75d. c.i.f. nom.
Manganese Ore (43%-45%) 69d./71d. c.i.f. nom.
Manganese Ore (38%-40%) nom.
Molybdenite (85%) basis 8s. 11d. per lb. (f.o.b.)
Titanium Ore—
Rutile 95/97% TiO₂ (prompt delivery) £28 0s. 0d. per ton c.i.f. Aust'n.
Ilmenite 50/52% TiO₂ £11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%) 155s. 0d./159s. 0d. per unit c.i.f.
Vanadium—
Fused oxide 95% V₂O₅ 8s./8s. 11d. per lb. V₂O₅ c.i.f.
Zircon Sand (Australian) 65-66% ZrO₂ £16/£16 10s. ton c.i.f.

and the invasion of the market by large quantities of Russian fibre, both of which may in certain products be substituted for blue to a marginal extent. As a consequence, stocks in South Africa have risen considerably. Nevertheless, it is apparent that the market is by no means saturated. While, for the first time in many years, the company has a stock of blue fibre in excess of its immediate shipping programme, the mines are now able to operate on a flexible basis and are capable of rapid adjustment to any fluctuations in demand.

Technically, both blue and amosite mines have seldom been in better condition, reserves being thoroughly adequate, and long-term indications giving good cause for satisfaction.

It was further stated that during the year another very large contract had been negotiated for the supply of both blue and amosite fibre to the U.S. Government through the office of the Commodity Credit Corporation. It is noteworthy that blue and amosite are the only types of asbestos fibre included in CCC's schedule.

PRODUCTION OF SCANDIUM

In our issue of April 8, p. 413, we reported the production of a pound of the rare metal scandium by Union Carbide International Co. in connection with two contracts with the U.S.A.F. It has

now been reported that scientists working for Rio Tinto Dow in Ontario have produced scandium in the process of extracting thorium from the waste liquors discarded from uranium lines. Rio Tinto has produced and sold only 2 lb. of scandium, which is worth between \$3,000 and \$4,000 a lb. The metal was produced by Rio Tinto Dow in a concentrate in pulp form. The concentrate was shipped to a company in the U.S., which turned it into metal for sale in 10 to 100 gramme lots to laboratories for experimental work.

WOLFRAM RISES AGAIN

The upward movement in wolfram ore shipment prices continues, and dealers' ideas now range from 155s. to 159s. per 1-ton unit c.i.f. Europe, compared with 154s. to 158s. previously. Buyers are still reported to be showing interest.

NEW NAMES FOR NICKEL ALLOYS

Henry Wiggin and Co. have announced new names for certain of their high-nickel alloys. This re-naming has become necessary because of the wide diversity of compositions which have been developed over the last few years to meet specific material requirements.

COPPER • TIN • LEAD • ZINC

(From Our London Metal Exchange Correspondent)

Generally speaking quiet conditions have prevailed in London during the week and whilst the amount of new business has been on a limited scale, the market has been reasonably active as a result of dealers taking advantage of present conditions to make day to day adjustments in their overall positions. Whilst certain outside factors have brought about lower copper and lead values, there has been little change in the overall picture as far as tin and zinc are concerned to effect the price structure of these two metals.

COPPER CUTBACKS APPEAR INEVITABLE

Consumer buying has recently been on a much reduced scale which, together with the settlement of the strike at the Anaconda company's El Salvador mine and Potrerillos smelter in Chile, initiated the downward reaction which has taken place during the period under review. This settlement was undoubtedly reached rather more quickly than had appeared likely because of the seriousness of the earthquake in the country. It provided for a 51 per cent wage increase for a fifteen-month period and work was resumed at the beginning of the week.

The withdrawal of consumers from the market can, in part at any rate, be attributed to the general belief that lower prices will be seen in the coming months. This, in its turn, is perhaps a natural consequence of the public statements—

in themselves an unusual feature—in recent months by leading personalities on the producing side of the industry regarding the prospective surplus of supplies this year unless production is adjusted to market requirements. Whilst it is impossible to foresee what their intentions may be in this respect, there seems little doubt that the main producers throughout the world are keeping in close touch and it may be assumed are in full accord on the question of cutting back production rather than witnessing a severe setback in prices.

An important but unknown factor here is the future position as regards supplies from the Belgian Congo where, in the Eastern region, a state of emergency has been declared following reports of increasing violence during the recent elections.

Whilst the London market has followed the general downward movement, prices have been sustained to a great extent by continued bear covering with particular emphasis on the June position. The backwardation remains steady at the recently established lower differential and there was a further increase of 120 tons in official warehouses last week bringing the total to 4,038 tons.

The U.S. physical market in the customs smelter and dealer fields continues very quiet and offerings of scrap on the basis of 24 c. for No. 2 wire are on the heavy side which puts some pressure on the customs smelter price of 33 c. No change is expected in this until there has been an opportunity of assess-

ing the likely trend of June deliveries. The export market has been easier in sympathy with the general conditions overseas. The main producers at 33 c. are reported well sold for June. The Belgian producer has adjusted its price to 32.75 B.frs. per kilo from 34.25 B.frs. per kilo.

WAITING ON UNO

The tin market has moved within narrow limits with rather freer offerings of cash metal, resulting in the maintenance of a small contango. Whilst the future outlook remains very uncertain, there have been some indications of better consumer buying, both from the U.S. and Continent but this failed to maintain the Eastern price which declined sharply during the week and on Thursday was equivalent to £787 per ton c.i.f. Europe. Last week stocks in official warehouses increased 209 tons to 8,388 tons.

In New York the U.N. Conference considering the draft of a new Tin Agreement is still in session and delegates have been putting forward the points of view of their respective countries.

LEAD-ZINC CONSUMPTION SATISFACTORY

Whilst zinc values have held steady as a result of the absence of any substantial offerings of metal for nearby delivery and a small backwardation was maintained at the end of month settlement, lead prices have lost some ground as a result of rather freer selling of metal, generally believed to be of Spanish origin, for early June arrival. Thus the backwardation has been eliminated and a contango established.

In both cases, demand on both sides of the Atlantic is running at a satisfactory level and in the U.S. consumption of lead rose 7 per cent in March compared to the previous month, whilst producers' stocks for the first time in more than two years were below 100,000 tons. Zinc consumption, however, failed to maintain February's level, being 1 per cent lower at 84,900 tons but in spite of this smelters' stocks fell by a small amount to 136,600 tons.

Meanwhile, the strike at the Broken Hill Company and at the American Smelting and Refining Company's properties at Wallace, Idaho, continue and no meetings are currently scheduled between the companies concerned and the Mine Mill and Smelter Workers Union.

Closing prices are as follows:

	May 26		June 2	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£240½	£241	£245½	£245½
Three months ..	£239½	£239½	£242½	£242½
Settlement ..	£241		£245½	
Week's turnover	13,650 tons		14,075 tons	
LEAD				
Current ½ month	£77½	£77½	£76	£76½
Three months ..	£77½	£77½	£76½	£76½
Week's turnover	6,200 tons		5,550 tons	
TIN				
Cash	£783½	£784	£785	£786
Three months ..	£783½	£784	£786½	£787
Settlement ..	£784		£786	
Week's turnover	365 tons		475 tons	
ZINC				
Current ½ month	£90½	£90½	£91½	£92
Three months ..	£90½	£91	£91½	£91½
Week's turnover	2,850 tons		3,600 tons	

Mining Finance

Dr. Verwoerd Disappoints

Dr. Verwoerd's statement on Union Day must have come as a severe disappointment to any who may have hoped that the political reappraisals which have been going on behind the scenes in the Nationalist Party since Sharpeville might by now have led to some revision of policy. Only time can tell whether the Prime Minister's uncompromising attitude is to be taken as the government's last word on its racial policy—at least until the next explosion—or whether, as is being more optimistically suggested in some quarters, it should be read as a "no comment" statement pending policy agreement within the party.

Meanwhile, business interests in the Union—Afrikaner no less than British—can have left the government in no doubt as to the consequences for the economic health of the country which must result from the present unyielding attitude. First we had Dr. Busschau speaking some two weeks ago not only for the mining industry but for the whole of the industrial and commercial community. Then at the Rand Mines meeting last week Mr. Charles Engelhard, from his intimate knowledge of America, said that South Africa would now find it difficult if not impossible to raise capital in the States on any reasonable

terms. Now this week Mr. Harry Oppenheimer, head of the largest mining and financial group in Southern Africa has, in his annual statement to Anglo American shareholders (page 654) made what amounts to a definitive review of the attitude of industry to the government's racial policies.

Mr. Oppenheimer takes as his starting point the fact that the present climate in Southern Africa is not one in which it is possible to attract the flow of resources—particularly finance and know-how—which is essential to the various territories if they are to continue to advance economically. Mr. Oppenheimer instanced four projects which Anglo has had to put into cold storage because of the difficulties in the way of attracting finance or expert knowledge at the present time.

There is a quite widely-held view that the main requirement in regaining the world's confidence for South Africa is no more than a long period of quiescence, during which the Union's problems will disappear from the headlines. Most investors, however, are not ostriches, and though a long period of comparative quiet would undoubtedly go some way towards restoring South Africa's credit on the world's money markets, more positive steps are necessary.

Basically Mr. Oppenheimer believes that the recent outburst of racial unrest was a crisis of frustration, and that until the cause of this frustration is removed, similar outbursts are likely, if not probable. In particular, this frustration is focussed on aspects of the pass laws. Although some means of personal identification may be necessary in South Africa's present state of development, the present system is based not so much on the necessities of administration as on the "pretence that permeates all the legislation dealing with the urban African that he is not a permanent resident where he lives, but merely a temporary visitor with his real home in quite a different part of the Union". This, patently, is quite unrealistic. There is a large and increasing African population in the towns, essential to the industrial life of the country, with little or no connection with their original tribal homes. Yet the authorities persist in regarding these people as migrants, using this attitude as a basis for such repressive acts as forbidding the African to own his home and taking the power to reserve at short notice any particular class of job for Europeans. Clearly the first requisite in any real change in the South African situation is an alteration in this attitude. Unfortunately, however, it is firmly rooted in the Nationalist philosophy.

Indeed, it is clear that the industry's very motives in expressing its notably moderate views are suspect from the Nationalist point of view. A leading article in *Die Transvaaler* last week said that "the point of view of those who think only of the economic aspect cannot be accepted in any circumstances". It describes the views of the business group as "demands", and says that if they were to be accepted this would be to allow civilisation in South Africa to be destroyed just to afford a certain group monetary advantage.

While such wild assertions do, at least, serve to discredit the government's case, they are on every other count discouraging to say the least. No wonder that South African industry is uniting irrespective of party.

U.M.H.K. AND THE FUTURE OF THE CONGO

In the present situation in Africa the views of the leaders of the great mining companies have assumed an unusual importance. Equally important is the manner in which these views are expressed. From this point of view the tone of quiet confidence which pervades the report of the Union Minière du Haut-Katanga—extract on page 659—stands in sharp contrast to the anxiety over the future of the Congo which is widespread in London.

The Congo's peculiar problem is that during its stewardship the Belgian administration tended to concentrate on economic well-being at the expense of training a native administration. Strenuous efforts have been made to overcome this handicap but the fact remains that the African administrators about to take over are, through no fault of their own, not of the highest standard in either training or experience. Provided that they can be ratified by the political authorities, however, the safeguards negotiated at the recent round-table conference have at least given a basis on which confidence can be built.

LONDON MARKET HIGHLIGHTS

After a marked recovery in the previous week the South African gold share market lapsed into lethargy last week. Business dwindled to its lowest for a long time and things were not helped by the fact that the Cape was closed on Tuesday for Union Day. In the circumstances it was not surprising that prices should sag, although the losses were never very important, Free State Geduld, for instance easing only 2s. 6d. to 123s. 9d.

These patches of inactivity must be expected from time to time in a market that is still no more than beginning its convalescence from the recent politically-induced recession. Given a continued absence of further racial upheavals, the share market should gradually improve but it will need a successful and more enlightened—or less severe—policy towards the African population in South Africa before there is any strong resurgence of investment in that country.

Copper share prices were also inclined to drift in idle trading conditions. There was a growing feeling that with the Chilean strikes settled, production cutbacks by the Copper-belt mines to avert a surplus of metal on the world market this year may not be very far off. But it may be that this factor has already been discounted in share prices.

One price to move against the trend for a while was that of Tanganyika Concessions which improved to 34s. in sympathy with the recovery in Brussels of Union Minière, in which "Tanks" has an important holding; later "Tanks" relapsed to 33s. on the news that their Benguela Railway subsidiary had declared an unchanged dividend.

In the lead-zinc group a very encouraging

annual report and statement from Consolidated Zinc revealed among other things that the group is getting closer to tackling its share of the huge bauxite project, but this made little impact on the share price of 75s. The report of New Broken Hill which, like that of Consolidated Zinc indicated that current year's earnings should show a fresh recovery, was followed by a rise in the shares of 2s. to 50s. Australian demand was largely responsible for the movement as was the case in Mount Isa which climbed another 2s. 3d. to 53s. 9d.

Perhaps the brightest of the mining markets was again the Tin group. A reasonable two-way business developed in which buyers again outnumbered profit-takers. But not all the price movements were upwards. Ampat were a weak spot with a fall of 3s. to 12s. 7½d., following the chairman's statement indicating that the mine's life was shorter than had been generally thought. The shares later steadied after the fall following the realisation that on the most conservative life estimates, likely dividend income over the next few years coupled with net cash assets very comfortably covered the share price. Another disappointment was the dividend and profits of Idris which resulted in a fall of 1s. to 9s. 9d.

On the other hand, a steady support—mostly from Singapore—developed for other Malayan tins. Once again, Ayer Hitam led the field with a rise of 6s. 3d. to 97s. 6d. Siamese continued to reflect the recently announced dividend and profits, advancing 2s. to 16s. 9d., and there was a steady support for Sungei Besi (28s. 6d.), Gopeng (27s. 9d.) and Tronoh (36s. 9d.).

The fact that U.M.H.K. is not unduly worried by the prospect of Congo independence is forcibly illustrated by the fact that its programme of capital spending is continuing unchecked. Reports from Elizabethville too, indicate that Belgians there are not showing any particular apprehension.

Only time will tell whether this is justified. Certainly, if the U.M.H.K. view is realistic, London may be regarding the Congo situation in an unduly pessimistic light.

POWER FOR WEIPA

That the development of the Weipa and Gove bauxite deposits was a task of the first magnitude, has been apparent since the earliest days. Indeed, it is such a large project that it takes a detailed discussion of the problems involved to bring it to life. This is provided by Consolidated Zinc, one of the partners in the project, in their report and accounts for 1959. During the year, the emphasis has shifted from alumina production to the proving of power resources for aluminium smelting. This in itself is a major operation, involving work in three countries. At the moment, three possible sources of power are being considered. First among these is a new dam site at Wabo in Papua. The potential here is about 800,000 kW. continuous, and the cost of power delivered to a smelter on the Papuan coast would be very low. On the other hand, this project does not lend itself readily to development in stages.

The second alternative is to use cheap, open-cut coal from the Blair Athol deposit in Queensland, combined in the early stages with power derived from a Queensland Government project based on another cheap open-cast coal deposit. Work at Blair Athol has proved some 240,000,000 tons of coal, B.T.U. rating 11,500, but no results of the work on costs are yet available, either for Blair Athol or the government project.

Lastly, work has recently begun on an investigation of the potential of the Manapouri-Te Anau lake system in South Island, New Zealand. At the moment, this alternative appears extremely promising, largely because power generated in the early stages of progressive development would be as cheap as that produced at full capacity.

Thus the date of starting actual development of the Cape York deposits is coming into sight, though a great deal of work remains to be done. Meanwhile, Consolidated Zinc's finances continue to depend on the production of a wide range of minerals, pigments and chemicals largely based on lead, zinc, rutile and zircon. Due to the voluntary restrictions on output imposed during the last seven months of the year and the import restrictions enforced throughout by the U.S., 1959 was a difficult year, and the fact that the average L.M.E. price for prompt lead was £70 15s. 7d., lower even than in 1958, raised still further problems.

On the credit side, however, Cons. Zinc could put increased efficiency at its own smelters while the proceeds of licensing the Imperial Smelting process to other companies, notably R.B.H., Penarroya and Centrosap (Poland), brought no less than £442,137 into the accounts. Of considerable importance too was the improvement in the average zinc price from £65 18s. to £82 5s.

These factors combined to make possible a group profit of little short of £4,000,000 before royalties and taxation, and a group consolidated net profit of £2,663,267, more than £1,000,000 up on the 1959 figures. This in turn permitted ordinary dividends totalling 4s. against 3s. on a lower capital for 1958. Extracts from the statement by Mr. L. B. Robinson, the chairman, appear

British Mining Equipment Export Association

The objectives of this recently formed export promotion association are discussed in our leading note this week on page 639. A first list of members was made public this week and is as follows:

Edgar Allen and Co. Ltd., Cable Belt Ltd., The Cementation Co. Ltd., Crawley Industrial Products Ltd., John Davis and Son (Derby) Ltd., Distington Engineering Co. Ltd., Dowty Mining Equipment Ltd., Eimco (Great Britain) Ltd., General Electric Co. Ltd., Hardy-pick Ltd., Hawker Siddeley Brush International Ltd., Hayden-Nilos Ltd., Head Wrightson Colliery Engineering Ltd., Austin Hopkinson and Co. Ltd., International Combustion (Export) Ltd., Joy-Sullivan Ltd., Martin, Black and Co. (Wire Ropes) Ltd., Mining Engineering Co. Ltd., Nortons-Tividale Ltd.,

Oldham and Son Ltd., Bruce Peebles and Co. Ltd., A. Reyrolle and Co. Ltd., Sheepbridge Equipment Ltd., Siemens-Schuckert (Great Britain) Ltd., Simon-Carves Ltd., Siskol Machines Ltd., Richard Sutcliffe Ltd., John Tinsley Ltd., Hubert H. P. Trist and Co. Ltd., Unifloc Ltd., Victor Products (Wallsend) Ltd., M. B. Wild and Co. Ltd., Hugh Wood and Co. Ltd.

The association believes that there are in Britain at least 300 firms manufacturing mining machinery and equipment for export who could benefit from membership, which is open to all British manufacturers.

Enquiries should be addressed to the Acting Director, British Mining Equipment Export Association, Boundary House, 7-17 Jewry Street, London, E.C.3. Phone ROYal 0141.

on p. 661. Also on that page are extracts from Mr. Robinson's statement to New Broken Hill shareholders. This contains a reference to the progress of work on the delineation of the siliceous zinc orebodies in the higher levels of the mine, which will give the company a useful flexibility in its operations as between lead and zinc.

A.S.A.I.C. SUFFERS LIKE THE REST

Among those hardest hit by the fall in the Kaffir market since the beginning of the year have been shareholders in the American South African Investment Company. By definition a growth stock, with the greater proportion of dividends received ploughed back into new investments, the growth in the period from flotation to May 19 totalled about 6s. 8d. per share.

This of course, is not the company's fault, and indeed, the long-term shareholder, who presumably is the backbone of A.S.A.I.C., has little to fear. A value of £13 15s. 5d. was reached at the end of December and this will be reached and surpassed, though obviously not tomorrow.

Meanwhile the company has continued to buy shares for its portfolio during the past quarter. Among the most interesting purchases are 5,000 De Beers, 15,000 Harmony, 18,500 Stilfontein and 5,200 Vlakfontein. A.S.A.I.C. also purchased shares in St. Helena, Doornfontein, South Roodepoort and Grootvlei during the first three months of the year, while Leslie and Bracken appear in the investment list for the first time.

DISAPPOINTING INTERSECTION AT VAAL REEFS

The No. 2 ventilation shaft at Vaal Reefs Exploration has intersected Vaal Reef at a depth of 4,905 feet below collar. Sampling around the perimeter gave average values of 473 in.-dwt. gold and 10.22 in.-lb. uranium.

Compared with the value of 819 in.-dwt. exposed in the No. 2 shaft itself, and the figures of 703 in.-dwt. and 83 per cent payability disclosed by the chairman as the average of sampling in this area to date, the latest disclosure is distinctly disappointing. It is, of course, likely that the latest intersection is out of step, rather than the previous shaft strike and the sampling results.

CENTRAL MINING PRELIMINARY RESULTS

Although Central Mining is raising its dividend rate for 1959-60 to 5s. from 4s. 9d., the results for the year will give little satisfaction to shareholders. The amount brought in to the accounts from dividends and interest rose slightly, from £1,908,412 to £2,093,828, but income under all other heads fell to a greater or lesser extent. Sharedealing earnings were down from £623,062 to £414,773, while sundry items were £20,000 down at £122,527. Against this, expenses rose from £227,845 to £268,231, so that gross profits declined from £2,446,555 to £2,362,897. A reduced tax charge, however, enabled the distributable profit to rise marginally from £1,281,555 to £1,337,897.

WRITE-OFF AT DEALESVILLE

One field of which a great deal was hoped, and which has disappointed the prospectors, is Dealesville. Several companies, notably Anglo-Transvaal, and West Vlakfontein, were interested in this 200,000 morgen prospect in the O.F.S., but all the participants have now dropped their contracts and options. This is revealed in the West Vlakfontein annual report for 1959. The £10,500 advance to Rand London, the company through which W. Vlak. held its Dealesville interest has, it is stated, been provided for in full.

Nevertheless, West Vlak. is still turning previous exploration work to profitable account. Through a 2½ per cent interest in the farm Modderfontein in the Waterpan area, W. Vlak. last year became entitled to subscribe for 67,091 fully- and partly-paid shares in Western Areas, while the large block of Winkelhaak shares acquired when that company was floated shows every sign of being a most satisfactory investment.

Mr. J. F. Ince has been appointed director of Rhodesian Corporation with effect from June 1, 1960.

Mr. Gerard Cravatte has been appointed managing director of the Société Minière du Beceka.

Chairman's Statement. ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED
Incorporated in the Union of South Africa

Race Relations in Union and Federation

NEED FOR RECOGNITION OF AFRICANS' RIGHT TO PERMANENT HOMES IN SOUTH AFRICA'S CITIES

Mr. H. F. Oppenheimer Reviews Effects of Political Risks on Anglo American Corporation's Plans and Progress

The following is from the statement by the chairman, Mr. H. F. Oppenheimer, which has been circulated to members:

On March 21 at Sharpeville, in the course of demonstrating against the pass laws 69 Africans were killed and 178 were wounded in a clash with the police. As a result of this deplorable event and widespread disturbances in other parts of South Africa the Government proclaimed a state of emergency. This situation has come about at a time when we are called upon to celebrate the 50th anniversary of the formation of the Union. The achievements of the past 50 years are certainly notable, but in present circumstances no thinking South African can look to the future without misgiving, and the feeling is widespread that new methods and new policies are urgently needed if we are to build a truly united South Africa. This mood is by no means confined to the political opposition.

African Discontent

The Federation of Rhodesia and Nyasaland also is going through a difficult time. Here African discontent is not directed primarily against discriminatory legislation but against the existence of the Federation as such. In the economic sphere the high hopes that were entertained when the Federation was formed have been more than realized and all races have shared in the general prosperity. Politically, and socially also, the African population has probably advanced faster and further in the last six years than in the whole history of the country. Nevertheless, influenced by what has happened in quite different circumstances in other African territories to the north certain African politicians in Nyasaland and Northern Rhodesia have succeeded in inducing a large part of the African population in these territories to believe, in contradic-

tion to the plain facts, that Federation is an instrument of racial oppression and that they would be much better off without it.

Recently the whole situation has been further complicated and race relations seriously embittered by a number of senseless attacks by bands of African hooligans on both Europeans and Africans. In one case these attacks resulted in the murder of a European woman and the injury of her two children. Barbaric incidents of this sort, which fortunately are isolated and which are condemned by reasonable African opinion, must be countered by firm action, but it is of the utmost importance that the Europeans in Northern Rhodesia, and throughout the Federation, should not allow their indignation at these incidents to divert them from the policy of partnership. I am confident that they will not do so.

The Monckton Commission, is faced with the difficulty of reconciling the demands of extreme African nationalists—who are always ready to brush aside the need for efficient Government and economic development—with the responsibility which the British Government must feel for maintaining law and order and for raising the standard of living of the masses in these countries which it has taken under its protection.

I am glad to be able to report that in spite of all these difficulties, operations at all the mines we administer have proceeded normally.

The consolidated profit, after tax, of the Corporation and its subsidiaries, allowing for minority interests, amounted to £7,730,864 compared with £7,181,537 in 1958 and £5,254,540 in the previous year, and was again a record. This satisfactory improvement is due to a substantial increase in income from investments. This, in turn, reflects the record profit levels achieved by the gold and uranium mining industry and by the

diamond industry and also the considerable improvement over the previous year in the profits of the copper mining industry of Northern Rhodesia. It was considered by your Board that the increase in profits justified an increase of 1s. per share in the ordinary dividend.

Last year was therefore a particularly successful one for our Corporation, and if it were not for the difficult political situation, the way ahead would be clear for a continuation of the rapid expansion and development of recent years.

The disturbances in the Union have gravely affected us in their immediate effects and we are, of course, also deeply concerned about their ultimate outcome.

We have always looked to London, and to a lesser extent to the other capital markets of Europe and to America, for a substantial proportion of the finances required for the South African and Rhodesian development for which we are responsible. The recent disturbances have affected these markets to a degree which is not generally appreciated in South Africa. Not only have they caused investors to fear for the safety of their holdings, they have evoked a wave of moral indignation against the present South African racial policy.

Moreover, the referendum on the republican issue overhangs the market, which is particularly affected by the possibility that if South Africa were to become a republic it might for one reason or another, cease to be a member of the Commonwealth. The consequences for our group are obviously serious. We think it is reasonable to expect that if conditions in the country remain quiet the share market will gradually improve, but, in my opinion, it would not be prudent for us to count on being able to raise sufficient money for a considerable time from the public either here or overseas, for our new ventures on terms that we would regard as satisfactory. We

will, therefore, have to rely to a greater extent than we would normally think desirable on the internal financial resources of our group. These are, fortunately, substantial, and provided we follow a conservative policy, there need not be for financial reasons, any serious slowing down in the tempo of our new development. It is not, however, only in regard to the in-flow of capital that the adverse effects of Sharpeville and its aftermath are felt.

For many new enterprises it is essential for a group such as ours to tie up with leading companies overseas, who are able to provide the essential technical and commercial "know-how". In no fewer than four instances large scale projects which we have had under active consideration have had to be put into cold storage for the time being, because our overseas associates are not willing to proceed until the political situation in the Union is clearer.

Overseas Opinion

In spite of these difficulties, our confidence in South Africa is unshaken and we are determined to continue to play our full part in the economic development of the country. We shall do this not only in our own direct interests, but in order to help to create that background of rising standards of living, which is essential in order to give South Africa a fair chance of dealing effectively with her social and racial problems. In the long run, however, prosperity in South Africa must depend on a general restoration of confidence. Great emphasis has rightly been placed on the need to restore law and order. It is, however, only a preliminary. Even a long period of quiescence will not suffice, unless, at the same time it appears that successful steps have been taken to regain the goodwill of the African population. Of course, not all the Africans are disaffected, and many people have argued that the disturbances were due merely to agitators and intimidators. There is no doubt that agitators have been busy and that there has been serious intimidation of law-abiding Africans by the extremists. Equally, however, there can be no doubt that there is deep discontent among the African population in the urban areas. That is why the agitators have been so successful. Law and order have been restored, but only at the expense of far-reaching interference with the liberties of the population, black and white alike.

Many people in South Africa are convinced that no changes in government policy or European attitudes short of complete surrender to the full demands of the extreme African nationalists would suffice to secure African goodwill. To this one can only retort that you never know till you try. Certainly South Africa's reputation overseas, and relations with the rest of the Commonwealth and the Western democracies in general, would be very different if they could be persuaded that a genuine and determined effort was being made to remove all the reasonable causes of discontent which have provided the background to the activities of extremists and agitators. The difficulty of dealing with an explosive internal situation is vastly increased if the world outside is convinced that genuine grievances exist and that no serious effort is being made to remove them. Only this month that

great American, Mr. Adlai Stevenson, made this important statement:

"Racialism is hateful whether it is black or white. America however, can use its influence to advocate African patience and restraint only if there is a clear prospect ahead for African advance. Where this is lacking—as in the Union of South Africa—the extremists will gain increasing influence"

Operation of Pass Laws

The immediate cause of the present crisis was African protests against the pass laws, and it is clear that this legislation, together with the laws governing the sale of liquor to Africans and the unsympathetic manner in which they are sometimes administered, are major causes of inter-racial friction. In the case of the liquor laws the necessary changes could probably be made without too much difficulty, and it is satisfactory to see that the government intend to tackle this problem, but when we come to the pass laws, the matter, as is so often the case in Africa, is far from simple. Some provisions covered by these laws are necessary for good government and are very much in the interests of the Africans themselves. It is essential to begin with, that there should be an effective means of personal identification, and this, with a people of whom the majority are still comparatively primitive, and in the absence of the necessary statistics which are taken for granted in a fully developed country, is not an easy matter. In addition, since South Africa does not possess either an efficient system of voluntary labour bureaux or (a much more difficult matter) an educated African labour force to take advantage of such a system, it is not necessarily wrong or against the Africans' own interests that for an interim period anyhow, administrative machinery should be maintained by the government to direct Africans seeking employment to the areas where jobs and proper housing are available to them.

Certain aspects of the pass laws are so intolerable to the urban Africans that everything connected with the whole system is included by them in the same condemnation. And what they resent most of all is the provision that the failure by an African to produce his pass to a policeman immediately on demand is in itself a crime punishable by a fine or imprisonment. The other features of the pass laws which do most damage to race relations flow from the pretence that permeates all the legislation dealing with the urban African that he is not a permanent resident where he lives, but merely a temporary visitor with his real home in quite a different part of the country. There was a time when it might have been reasonable to regard the bulk of the Africans in the urban areas in this light. But that time is long past and today, while large numbers of tribal Africans still come to work in the urban areas, there is a very large and increasing African population in the towns whose connection with their original tribal homes has almost or entirely ceased to exist. Moreover, these urban Africans are absolutely indispensable to the industrial life of the country. Nevertheless, they are treated as though they were migrants, and the pass laws and other legislation operate to prevent their obtaining the right of permanent occupation of the only homes they have. If they lose their jobs and do not find another one within a short period, they

may be uprooted and forced to go to quite a different part of the country. In this way, families are broken up and the urban African is denied that sense of permanence and security which is one of the prime needs of all human beings.

It is difficult to exaggerate the sense of frustration these features of African urban life cause, particularly amongst the growing number of intelligent and educated men who hold responsible positions. And it is these people who are the moulders of African thought and the effective leaders of their people.

It seems to me that what in the first place is required, in order to improve race relations, is that white South Africa should fairly and squarely face the fact that whatever may be done to build up the economy of the reserves, so as to enable them to carry as large a population as possible (and I hope that every effort will be made to this end), there will necessarily remain millions of Africans in and around the European cities who have their permanent homes there and belong to those urban communities just as much as the Europeans themselves. Once that fact is grasped and the consequences that flow from it worked out and acted upon, we shall, I believe, have gone a long way to remove the sense of grievance and frustration which lies behind the present crisis.

Grounds for Optimism

It is true that Southern Africa is subject to serious political risks. But there are very few parts of the world where there are not serious political risks of one kind or another. And in Southern Africa, in spite of all the problems and difficulties, there are solid grounds for optimism. The Union and Southern Rhodesia are multi-racial countries with a comparatively large European population. Europeans are in a minority as compared with the Africans but are certainly not a small and helpless minority to be swept aside or tolerated as the African majority may decide. In Northern Rhodesia the European population is smaller both absolutely and in relation to the Africans. The Europeans, however, occupy a key position in the copper mining industry which is the most important industry in any of the territories that make up the Federation, and on which the economy of the Federation in a large measure depends. Without the Europeans, that industry would come to a standstill. Nyasaland has only a very small European population and must be regarded as almost entirely an African country. Nevertheless, it depends for its economic welfare on very close links with Northern and Southern Rhodesia, and to a lesser extent with the Union. In all these territories the time has passed, if it ever existed, when Europeans could afford to ignore the interests and feelings of the Africans. But that does not mean that the Africans are, or will be, able to get along without the Europeans. In all the four territories with which we are concerned, conditions differ and the constitutional forms which apply to one will not necessarily be appropriate for the others. Nevertheless throughout this vast area, the safety and welfare of all the races who inhabit it are inextricably tied together. Eventually they will be forced to work together, and the sooner this is accepted the better for all concerned.

ANGLOVAAL GROUP

*These extracts from the chairmen's reviews of companies associated with the Anglovaal Group are reprinted from the Annual reports for the year ended December 31, 1959. Copies of the reports have been posted to all members listed on the Johannesburg and London registers of the companies.

MIDDLE WITWATERSRAND (WESTERN AREAS) LIMITED

The arrangement for the acquisition by your company of 87½ per cent of the assets of Rooderand Main Reef Mines Limited was sanctioned by order of the Supreme Court of South Africa, as a result of which 840,448 ordinary shares of 2s. 6d. each in the capital of your company, being the purchase consideration, were duly allotted to shareholders of the Rooderand company. The issued capital of your company is now £1,000,000 in 8,000,000 shares of 2s. 6d. each.

The company's trading profit for the year under review was £528,671 which was £58,844 more than the preceding year. Dividends totalling 1s. 3d. per share were paid for the year in comparison with 1s. per share for the previous year. The major portion of the company's gross income is still derived from its interest in mines in the Klerksdorp area.

The book value of your company's quoted investments at December 31, 1959, has increased by £1,312,517 compared with the figure at December 31, 1958, to £4,288,613. This increase is mainly due to the acquisition of investments from the Rooderand company and the additional shares acquired in Loraine Gold Mines, Limited as a result of the increase in the capital of that company. The market value of your company's quoted investments at December 31, 1959, was £9,811,248. Since the end of the financial year there has been a decline in share market prices and the market value of the quoted investments of the company at April 30, 1960, was £7,700,056.

Partly through the acquisition of the Rooderand assets and partly through your company's own participations and shareholdings, we have acquired a holding in Western Areas Gold Mining Company Limited, the company which was formed to work the new mining lease area on the West Rand, south of Randfontein. Your company's holding of Feralloys Limited shares has recently been disposed of to The Associated Manganese Mines of South Africa Limited on a share for share basis, for deferred shares in that company.

A vigorous prospecting programme was continued during the year in the Transvaal, the Orange Free State and in the Central African Federation. The map (in the report) shows the location of the company's principal prospecting and other interests. The "Dealesville Block" in the Orange Free State, mentioned in my review last year, was abandoned during the year as drilling results were unfavourable.

In the "Bothaville Block," which covers areas totalling approximately 140,000 morgen of the Bothaville, Odendaalsrus and Wesselsbron districts of the Orange Free State and also in the Wolmaransstad district of the Transvaal, an extensive drilling programme is continuing. Three boreholes have been completed with negative results and a further three boreholes are now in progress.

Since the end of the financial year your company has become interested in a further block of options in the Bothaville district, termed the "Bothaville (Vaal River) Block," situated to the east of the aforementioned "Bothaville Block" and comprising about 25,000 morgen of ground along the southern bank of the Vaal River. No drilling has yet been commenced in this area. The company is also interested in a block of options, the "Bapsfontein Block," comprising some 26,500 morgen in the Delmas and Bronkhorstspuit districts of the Transvaal where a borehole is at present being drilled. The drilling programme in the area east of the Hartbeestfontein and Buffelsfontein mines was continued without any success. One borehole, approximately 4 miles east of the Buffelsfontein mine and 3½ miles north of the Vaal River is still in progress.

In the Central African Federation your company has increased its participation in various exploratory ventures, in which it is interested. As a result of the acquisition of the Rooderand company's assets, the various prospecting companies through which these operations are being conducted have now become subsidiaries of the company. Their prospecting ventures include nickel, chrome, copper, graphite and beryllium. During the past financial year work has been concentrated mainly on a promising nickel deposit near Bindura and on other nickel prospects in Southern Rhodesia, and active prospecting is still in progress on these prospects. Small scale mining operations have been commenced on a chrome deposit in the Belingwe area in Southern Rhodesia and it is hoped that it will be possible to extend the scope of these operations as and when the market for chrome ore improves.

CHAIRMAN: MR. S. G. MENELL

Annual General Meeting: 11 a.m.,
June 28, 1960.

CONSOLIDATED MURCHISON (TRANSSVAAL) GOLDFIELDS AND DEVELOPMENT COMPANY LIMITED

The demand for antimony cobbled ore and concentrates showed a further increase during the year and there was a ready sale for the year's production. The substantial increase in the volume of antimony ore exported accounts for the increase in revenue from £741,315 in 1958 to £925,346 in 1959. During the latter half of the year the mine operated at full capacity.

The tonnage mined came entirely from the Gravelotte section where the development continues to be well ahead of mill requirements. This section has for the past ten years been the main source of supply of ore to the mill and, although by no means exhausted, has a limited life. For this reason the ex-

The Mining Journal—June 3, 1960

ploration programme which has been carried on for some years has been intensified and a further expansion of these activities is planned for the current and future years. The exploration referred to comprises underground development and diamond drilling, together with geological and geochemical prospecting on surface followed where warranted by diamond drilling. In this connection certain additional mining claims have been acquired during the year under review as mentioned in the directors' report.

CHAIRMAN: MR. S. G. MENELL

Annual General Meeting: 12 noon,
June 30, 1960.

THE ASSOCIATED MANGANESE MINES OF SOUTH AFRICA LIMITED

The falling off in the demand for manganese ore and the decline in prices to which I referred in my review last year, is reflected in the results of operations of your company for the year under review. The excess of income over expenditure for the year (inclusive of that of the wholly-owned subsidiary, Gloucester Manganese Mines (Postmasburg) Limited) was £492,896 as compared with £1,131,709 for the previous year. An interim dividend of 1s. 6d. and a final dividend of 1s. per share were declared in June 1959 and November 1959 respectively, totalling 2s. 6d. per share for the year as compared with 4s. 6d. per share for the previous year.

Towards the end of the year under review, however, there was a marked improvement in sales of manganese ore although prices have remained more or less unchanged.

Owing to the accumulation of large stocks of ore at the mine, your company was able to take immediate advantage of the improved position and large orders for delivery during 1960 have been accepted.

I am pleased to inform members that a new field is being opened to your company in the production and marketing of iron ore. Some cargoes of iron ore have been shipped recently to overseas consumers and, given adequate railway transportation facilities, the prospects of establishing a regular export market appear favourable. The improvement in the South African Railway's truck position has made it possible to consider the development of the export of this product.

In terms of a special resolution of members passed on December 21, 1959, your company acquired the remaining 60 per cent of the shares of Feralloys Limited, namely 1,200,000 shares of 10s. each in consideration of the issue to the vendors of 1,200,000 deferred shares of 5s. each credited as fully paid, in The Associated Manganese Mines of South Africa Limited. Feralloys Limited thus became a wholly-owned subsidiary of your company at December 31, 1959. It officially commenced production of ferro-manganese in October, 1959. The initial small production and the usual teething trouble in the launching of an industry of this nature, resulted in a trading loss for the first few months. These difficulties have been largely overcome and the plant is now operating satisfactorily.

The improved sales position of manganese ore to overseas consumers, the new outlet for your company's product to the ferro-manganese plant of Feralloys Limited and the production of iron ore are three factors contributing to a brighter outlook for your company for the ensuing year.

CHAIRMAN: MR. S. G. MENELL

Annual General Meeting: 10.30 a.m., June 29, 1960.

VIRGINIA ORANGE FREE STATE GOLD MINING COMPANY LIMITED

The tonnage milled during the year increased by 290,000 tons to 1,546,000 tons but the recovery grade of 4.752 dwt per ton was 0.488 dwt per ton lower than in the previous year. The decrease in grade, in spite of a reduction of 10d. per ton milled in the working costs, reduced the working profit from gold production, which at £191,694, was £325,289 less than in the previous year. Production of uranium oxide was sufficient to ensure that the quota of 649,760 lb. was fulfilled. However, due to a decline in recovery grade from 0.506 to 0.420 lb. per ton treated, the working profit from uranium oxide production decreased by £24,290 compared with the previous year to £1,773,544. The working profit from acid production increased by £14,561 to £366,734. The total working profit from all operations was thus £2,331,972. After the addition of sundry non-mining revenue £36,799 and the deduction of debenture loan stock and other interest amounting to £435,969 the net excess of income over expenditure for the year was £1,932,802, a decrease of £248,191 compared with the previous year.

The capacity of the reduction plant remains unchanged at 150,000 tons per month. The tonnage milled was increased in stages from 114,000 tons in January, 1959, to 134,000 tons in May, 1959. A record tonnage of 136,000 tons was milled in November 1959, but this rate has not been maintained and the milling rate for the first three months of the current financial year has averaged 129,000 tons per month.

No change has been made to the quota of 649,760 lb. of uranium oxide which may be sold by your mine to the Combined Development Agency. Improvements have been made to the uranium plant and have resulted in better extraction. Despite these improvements it has been necessary to mill a higher tonnage than had been originally foreseen to fulfil the mine's quota due to declining uranium values.

A programme of research in the field of utilization of uranium has been initiated by the Atomic Energy Board. Uranium producers in South Africa have jointly agreed to contribute annually over a period of five years from April 1, 1959, towards the cost of this programme. This company's proportion of the joint contribution, based on the number of pounds of uranium oxide sold, amounted to £15,320 for the nine months to December 31, 1959, as shown in the income and expenditure account.

During the year, 6 level station, No. 2 Shaft, was excavated and the 6th, 8th and 10th levels were connected by twin ore-pass system. Main crosscuts were

developed eastwards in the direction of No. 3 Shaft and the Leader Reef was intersected on the 8th and 10th levels. Development on the Leader Reef in this area totalled 3,150 feet, and of this 260 feet, equivalent to 8.3 per cent proved payable at 226 inch-dwt and 22.66 inch-lb. over a channel width of 25.1 inches. Work on these levels was temporarily suspended in October 1959 in order to provide additional ventilation facilities in the south-western section of the mine.

Development footage was increased by 9,943 feet to 82,196 feet. Footage sampled increased by 10,650 feet to 44,595 feet. A large portion of the reef development was again advanced on Basal Reef in the south-western portion of the mine, where payability and values proved disappointing. Payability declined from 36.1 per cent to 26.3 per cent and the gold and uranium values decreased from 319 inch-dwt and 26.64 inch-lb. to 283 inch-dwt and 23.21 inch-lb., respectively.

The total ore reserve increased by 9,000 tons to 2,301,000 tons but the ratio of available reserve to unavailable reserve has altered considerably. The available ore reserve decreased by 369,000 tons to 1,500,000 tons at a value of 5.27 dwt of gold and 0.537 lb. of uranium oxide per ton while the unavailable ore reserve increased by 378,000 tons to 801,000 tons at 5.73 dwt and 0.644 lb. per ton. The transfer of some 350,000 tons of ore from available to unavailable ore reserve has become necessary in order to leave adequate safety pillars in the known water-bearing zones.

Your board is investigating the possibility of some arrangement whereby your company would treat ore from the Merriespruit mine on a royalty basis. It is considered that such an arrangement, if it can be accomplished, would be of benefit to your company.

The hearing of the action instituted against your company and Merriespruit (Orange Free State) Gold Mining Company Limited to restrain your company from discharging underground water into Doornpan (to which I referred in my review last year) was recently concluded and judgment has been reserved.

CHAIRMAN: MR. S. G. MENELL

Annual General Meeting: 11 a.m., June 30, 1960.

MERRIESPRUIT (ORANGE FREE STATE) GOLD MINING COMPANY LIMITED

As stockholders were informed in the circular sent to them on October 22, 1959, the two-stage programme for bringing the mine back into production first undertaken some two and a half years ago was discontinued.

Your board is investigating the possibility of some arrangement whereby the Virginia mine would treat ore from your company's mine on a royalty basis. It is considered that such an arrangement, if it can be accomplished, would be of benefit to your company.

Development has been confined mainly to exploratory work on basal reef in the area where underground boreholes had indicated payable reef. Of 2,020 feet sampled during 1959, 65.6 per cent. proved payable at an average

value of 304 inch-dwt and 15.39 inch-lb. over a channel width of 32.7 inches. The Virginia 28th level haulage was continued towards No. 1 shaft. On March 31, 1960, the haulage and its companion had advanced to 7,988 feet and 8,000 feet, respectively, inside the Merriespruit property.

Expenditure during the year, after allowing for recoupments, amounted to £375,134, of which £230,734 was expended to development. The amount unexpended at March 31, 1960, was £227,996.

CHAIRMAN: MR. S. G. MENELL

Annual General Meeting: 10.30 a.m., June 30, 1960.

ZANDPAN GOLD MINING COMPANY LIMITED

Full scale sinking operations at No. 1 Shaft commenced in July 1959 several months ahead of the time planned when the prospectus was issued in November 1958. This was possible because the Electricity Supply Commission provided electric power well ahead of schedule.

In spite of delays occasioned by the intersection of water bearing fissures requiring cementation, satisfactory progress has been made in sinking the shaft. On April 25, 1960, it had reached a depth of 3,399 feet and a permanent intermediate pump station on the 2,500 foot level had been excavated. A concrete ventilation wall is being installed in the shaft concurrently with sinking.

The installation of the first of the two permanent 5,145 h.p. winders is nearly complete and it is expected that the second winder will be commissioned before the end of the year. In order to avoid delays in the commencement of a second shaft, when it is required, orders have been placed for hoists, for which there is a long delay in delivery.

The early start on full scale shaft sinking has resulted in capital funds being spent sooner than previously planned. At the end of the year the first three months of this year, making a total of £2,655,205 to the £2,430,161 had been spent and a further £225,044 has been spent during end of March 1960. The balance of the £3,000,000 obtained from the initial issue of shares will be exhausted in May of this year, some seven months before the £2,500,000 accrues from the issue of the option shares at the end of November 1960.

Short term loan facilities have been arranged to finance operations between May and November, and these temporary loans will be repaid out of the proceeds of the option issue.

CHAIRMAN: MR. B. L. BERNSTEIN

Annual General Meeting: 12 noon, June 28, 1960.

*The annual general meetings will be held on the dates and times stated at 56 Main Street, Johannesburg. All companies referred to in this advertisement are registered in the union of South Africa.

THE F.M.S. CHAMBER OF MINES LESSENING BURDEN OF OUTPUT RESTRICTION

The Forty-Ninth Annual General Meeting of the F.M.S. Chamber of Mines was held in Ipoh on May 28. The following is the speech by the President, **Mr. P. A. Delmé-Radcliffe** :—

When we made our annual review last year we had just passed through the period of most severe restriction, and the International Tin Council had only just permitted the first increase in the total permissible export amount to a figure of 23,000 tons from the lowest figure of 20,000.

During this year the burden has continued to grow lighter, and the total permissible export amount stands now at less than 8% below the figure for production before restriction was imposed.

Production cannot however be switched off and on like a tap, as is sometimes imagined, and it may be some time before mining in this country fully recovers, and its output can return to pre-restriction figures.

The number of units operating in January, 1958, at the beginning of restriction, was 76 dredges and 573 gravel pump mines. The figures in March this year were 52 dredges and 425 gravel pump mines. It will be seen that although this shows a considerable recovery from the situation last year, when the figures were 34 dredges and 333 gravel pump mines, we are by no means back to where we were before.

How long the industry will take to recover, and indeed whether total recovery does take place, depends on the economic climate both in Malaya and abroad.

Export Duty

We have for years cried out against the export duty on tin ore. Miners the world over regard such a tax as excessively burdensome. A tax on profits is one thing, but to tax a primary producer on his product tends to put him out of business—or to prevent him starting.

Taxation on sources of power also raises mining costs, which a miner cannot pass on—as other industries can, and do—to the consumer. Marginal producers therefore can only go out of business.

If tin is to retain its present market, the supply of metal must be kept up, even considerably expanded. Marginal producers cannot therefore be disregarded. It is unfortunate that the special position that mining holds with regard to taxation should remain unappreciated here so that, in consequence, mining bears relatively a heavier burden of taxation than other industries.

Apart from the loss of revenue that occurs when marginal mines go out of production, there is a loss of the country's capacity to produce tin, and more important still, a loss of employment opportunity. This last would be a serious matter anywhere, but it is the more so in Malaya on account of the very rapid rise in the population.

Persons employed in the industry before restriction of production, numbered 37,171. Under the most severe limitation of exports ruling last year the figure decreased to 21,340. Although we are now back to a total permissible export amount equivalent to about 92% of the rate of production that existed before restriction, actual production itself is not

yet at that figure and, in consequence, the numbers employed at the end of March were still only 25,514. Anything therefore that hinders the industry's recovery bears particularly heavily upon those who would otherwise expect to find their livelihood by direct employment on mines and upon those who depend indirectly upon mining by supplying goods and services to the industry.

It is at least fortunate that the position of this country as the world's premier tin producer, and indeed her right to her proportion of the world total permissible export amount, is protected at present by mine-head stocks, for the accumulation of which men, who would otherwise have been unemployed during the period of heavy restriction, were kept at work. By drawing upon these stocks now our permitted exports can be kept up, though the amount is, for the time being, in excess of mine production.

These stocks cannot however be expected to last for ever, and it is therefore most necessary that mines that seek to re-start operations, or new ones seeking to open up, should not be discouraged from doing so by inappropriate taxation. There is no doubt that the industry is capable of producing all and more than the country is allowed: There is also no doubt whatever that a great stimulus would be given to the industry by the removal of, or a reduction in, the rate of export duty, and by the removal of taxation that directly or indirectly increases power costs.

I said something last year about the old and erroneous complaint that mining inevitably ruins the land. Wrong though this is, there would be no harm in giving the miner some inducement to create a higher value for the land which he leaves behind him. To do so might at the same time release for mining areas now held under other title.

Where agricultural lands are converted to mining, there is at present no guarantee that after the land is worked out the title holder will again be able to possess himself of his land. A right to reconvert to agricultural title might well induce the temporary release of some areas of land that would otherwise never be mined for the extraction of the mineral lying beneath them. Would not such a right, granted to the title or lease holder, be the best possible encouragement also towards re-establishment of land values? The extraction of mineral is a temporary, but extremely valuable activity. Agriculture and other land uses are continuing ones.

Where no use was made of land or was not even possible before mining, would not the right to an agricultural or other title, at least for a number of years after the extraction of mineral, be a strong inducement to the miner to do what every State would like him to do—make the land as fit as possible for cultivation, or other use, even though it had no value before he mined it?

Last year we took note of the rapid progress of the Emergency. The most heartfelt congratulations are today due to the Government of this country, to the security forces, and to all those who have made it possible to declare that the Emergency will come to an end on July 31.

Ideologies are only as invincible as people think they are. Malaya may in these last twelve years have rendered the

whole world a service of which it is not yet fully aware.

Tribute to Mines Department

May I on your behalf once again pay the industry's tribute to the Mines Department for the services they render us? I am sure that the present easing in the severity of tin control must be almost as great a relief to them as it is to us. The administration of control has been an additional duty and a difficult burden upon the officers of the Department; a thankless task of which I am sure they would be glad to be rid. Though that may not yet be possible, we all hope that the internal administration will shortly become easier and pleasanter to carry out, both for the Mines Department and for those representatives of the industry who have earned our thanks for the time they have given to the Central and Regional Committees.

The Geological Survey continues to be a source of information to the industry. It is for that reason that I would like to ask again that the results obtained from the field work carried out by the Department be published at the earliest possible date after completion.

Turning from domestic tin matters to those international ones which are uppermost in our minds at the moment, your members upon the Tin Advisory Committee, with the representatives of the Ministries concerned, have throughout the year been assisting the Federation Government in formulating the policy that has been followed by the nation's delegate to the International Tin Council. A sub-committee has also been dealing with the drafting of a new agreement, all the time keeping in the closest touch through the Ministry of Commerce and Industry with Sir Vincent del Tufo, Malaya's distinguished delegate to the Tin Council. It is hoped that this work has helped towards a draft that may be acceptable to all participating countries—Producer and Consumer alike—if it is decided that a new agreement is necessary.

I would like to say here a word of thanks and of admiration for the tremendously hard and skilful work that the Minister of Commerce and Industry and latterly the Assistant Minister of Rural Development, and their officers, have performed on behalf of the industry. The Tin Advisory Committee has in consequence been one on which it has been a pleasure as well as of great interest to serve.

The United Nations meeting is currently taking place in New York to decide upon the need, or otherwise, for a new international tin agreement. It is too early to comment and, indeed, it would be inappropriate to express a view upon the possible outcome of the meeting until the full details of it are known. It would seem however that a new agreement would keep in being a valuable International Council whose duty it is to watch for, and to act when necessary to prevent as far as possible, violent fluctuations in the price and availability of tin metal. The continuation of the agreement—or rather its replacement by a new one—does however depend at least upon all those producing countries which now participate continuing to do so. It could not be expected that the remaining producing countries would continue if any one of them were to withdraw.

There is also the possibility that the success of any new agreement may be

put in jeopardy by increasing exports of tin from countries outside the agreement. The signatory producing countries might, under such circumstances, wish to be freed rapidly from export restrictions that would then be not only intolerable, but futile.

Liquidating the Buffer Stock

It is also most necessary that satisfactory means should be found for liquidating the buffer stock created under the present agreement. This stock is provided by the producing countries only, and in Malaya anyway, by the miners themselves. For five years now very considerable sums have been tied up in it. Like other men, miners come and miners go, and it becomes necessary, if for no other reason, that their assets in the buffer stock should not be frozen indefinitely. To carry the present buffer stock on into the new agreement would extend the freeze to a total of ten years.

Now that control has stabilized the supply and demand position, it seems to me questionable whether, if there is a new agreement, so large a buffer stock as the present one is really necessary. The control of exports provides the main regulating machinery and operations by the buffer stock manager need to do more than provide a fine adjustment during any control period. A large buffer stock certainly allows individual con-

sumers to carry less stock themselves; is it however reasonable to ask producers to finance in this way consumers' inventories?

It would also appear to be an open question whether a useful purpose is served by a floor price. Since the buffer stock manager may buy at £780 a ton, it is essential to add that he must buy at £730?

These, and many other matters, are however ones that can be left in the hands of the Federation's delegation to the United Nations meeting. We have advisers there fully representative of the Federation's tin mining industry, and I have no doubt that we will be given the opportunity of expressing our views upon the new agreement in its final form as it may evolve there, before ratification.

Finally, I wish to express my thanks, and I am sure yours too, to members of the Council, to our secretary, Mr. Pearson, and to all our staff.

There is every indication that we have before us now a year of almost unrestricted production. I have no doubt that given those conditions of land tenure and of taxation for which we have for so many years hoped, the industry would rapidly achieve the full employment and prosperity that would maintain the Federation of Malaya as the world's greatest tin producing country.

The Chairman considered that the future could be looked at with confidence; he expressed the Company's wishes for the success of the new Congolese Government and assured it of its loyal assistance.

The Chairman then dealt with the problem of the legal statute of Congo Companies in connection with the future Independence of the Congo. He mentioned that a law is being submitted to the Belgian Parliament which would allow these Companies the choice between the maintenance of their present statute as Belgian Companies and the acquisition of the quality of a Congo Company.

The Board's intention was to maintain Union Minière's present statute as a Belgian Company for all operations covering activities outside the Congo and to form one or several Congo Companies who would be entrusted with the operations in the Congo.

Main points of the Board of Director's Report

The mining activity remained centered on Prince Leopold Mine and on the mines of the Western region. The total extraction reached nearly 6.75 million metric tons of ores; about 20 million cubic meters of overburden were excavated. The improvement of the copper market allowed an increase of the programme from the beginning of the second quarter so that the production of the year reached 280,400 metric tons, an increase of about 45,000 tons over the previous year.

Cobalt production reached 8,430 tons, i.e. 2,000 tons more than in 1958; the price was reduced to \$1.75 per lb. as of February 1, 1959.

Zinc concentrates production amounted to 118,000 tons assaying 60% zinc. An appreciable recovery occurred in the zinc market and prices rose.

Production of uranium concentrates and precipitates at the Shinkolobwe plant were 2,900 tons assaying 72.7 of U₃O₈. The selling price was lowered to \$7 per lb. of oxide U₃O₈ contained in the precipitates. Deliveries of radium amounted to 101.6 grams.

The Company also produced 13,640 kgs of germanium metal, 99,800 kgs of cadmium, 198 tons silver and 24 kgs gold.

The construction of the new electrolytic copper and cobalt plant at Luilu has been actively pursued in the course of the year, which enabled it to start production at a provisional capacity of 50,000 tons of copper a year, at the beginning of April 1960. It is expected that the final capacity of 100,000 tons of copper and 3,500 tons of cobalt per year will be reached some time during the first half of 1961. The construction of the new concentration plant at Kambove was resumed and it is anticipated that it will be commissioned early in 1961.

The electric power produced by the Haut-Katanga power plants reached 2,182 million kWh.

The personnel force has increased from 20,215 units to 21,146, whereas the force of the conducting staff remained at about 2,200 units. The Company has continued its policy of training and promoting its African personnel, which provides for promotion to the conducting staff of the elite of the Congolese employees.

The scholar population continued to increase. Some 20,000 pupils attended the Company schools.

Social atmosphere was excellent.

UNION MINIERE DU HAUT-KATANGA

The Annual General Assembly of Shareholders was held in Brussels on May 25, 1960, Mr. Paul Gillet, Chairman of the Board of Directors, being in the chair.

The Assembly approved the balance sheet and the profit and loss account for the financial year ending December 31, 1959. The latter showed a gross profit of 5,225,030,846 francs. After deduction of amortization for the year, provision for taxes on profits, interest and sundry taxes and royalties, the net profit amounted to 3,535,599,030 francs.

The Assembly fixed the net dividend for the year 1959 at 2,200 francs per share (or 220 francs per tenth of a share). Taking into account the interim dividends of 600 francs paid in January 1959 and of 600 francs paid in March 1960 (or 60 francs each per tenth of a share), the balance of 1,000 francs per share (or 100 francs per tenth of a share) becomes immediately payable.

The Board of Directors paid tribute to the memory of its Honorary President, Chevalier Firmin Van Brée, and to the memory of Mr. Jentgen, delegate of the "Comité Spécial du Katanga".

The General Assembly re-elected Sir Ulick Alexander, Mr. E. Gorlia and Mr. L. Wallef as directors and Mr. A. Bourgeois as statutory auditor. Captain C. Waterhouse was elected a director. Mr. Hutchinson, for reasons of personal convenience, placed his mandate of director at the disposal of the Assembly.

The General Assembly was followed by an Extraordinary Assembly. The increase of capital of the company which had been announced has not been submitted to the Assembly, the question still being under examination by the "Comité Spécial du Katanga" whose approval is requested by the statutes.

Sundry minor modifications to the statutes were adopted by the Assembly.

The address of the Chairman Mr. P. Gillet

The Chairman expressed the hope that, in the new political frame of the Congo, a mutual understanding of interests will favour judicious solutions which will prove essential if fresh capital is to be attracted to the Congo. The development of future programmes will be largely dependent on the political, economical and social climate that the new authorities will be able to create.

To this day, the Company had made no modification in the normal rhythm of its financial and commercial operations.

The new Luilu plant which had just started operations was one of the principal recent realizations of the investment programme. Other investments were contemplated which will ensure a continuous increase of production.

Although a certain excess of copper production is possible in 1960, the surplus will however be small if the present favourable perspectives of the world economy materialize.

During the first five months of 1960, copper prices have again been subject to wide fluctuations. Union Minière, however, continued its policy of price stability. The Company deems that excessive price variations are unfavourable to the interests of industry. It is to be wished that copper companies adjust their production to the real needs of the market in order to avoid speculation resulting from surpluses and shortages of metal. Too high prices in particular have the effect of encouraging the use of substitutes.

The Africanization of our staff has made great progress. The action undertaken will be pursued with a view to gradually entrusting Africans with functions of increasing importance.

ARISTON GOLD MINES

MR. C. J. BURNS'S STATEMENT

The 30th annual general meeting of Ariston Gold Mines (1929) Ltd. was held yesterday at the Chartered Insurance Institute, London, E.C.

Mr. C. J. Burns, Chairman, presided.

The following is an extract from his statement circulated with the report and accounts for the year ended September 30, 1959:

As a result of the year's operations billion revenue increased by £42,695 to £1,899,604 and with mining costs slightly higher and ore development expenditure some £20,693 more than the previous year the profit before taxation of £335,562 remains substantially the same as last year. Your Directors have, therefore, decided to recommend a final dividend of 10% making a total of 20% for the year under review.

This dividend on the increased capital (equivalent to an annual rate of nearly 23% on the old capital) is in line with the forecast made at the time of the new issue of shares in August, 1959. In addition, in the light of the results for the first six months of the current year your Directors have declared an interim dividend of 10% in respect of the year to September 30, 1960. When your Board forecast a dividend of not less than 20% on the increased capital of the Company we had in mind the capital expenditure programme outlined in my Review last year.

It is anticipated that this programme will extend to the end of 1961 by which time new areas will have been opened up and a much more detailed picture of the behaviour of the known orebodies at depth obtained. At that juncture it will be possible to review the Company's future dividend policy.

Development Planning

Following the programme of development to depth the decision was taken during the year to sink an internal Shaft from the 30th Level at a position 960 feet North from Central Shaft. This shaft, to be known as Central Sub-Shaft, will be the exploratory spearhead to depth and it will be possible to combine lateral development on the various horizons below the 30th Level, with uninterrupted sinking of this shaft.

The positioning of Central Sub-Shaft and of No. 4 Winze was selected to suit the southerly trend of the orebodies and are 2,140 feet apart.

In view of the projected development to depth it is important to realize that given the similar pattern of orebody exposure below 30th Level as, say, on the 20th Level then the programme of continuous sinking can be considerably postponed. On the 20th Level the increase in ore reserves amounted to some 1,000,000 tons for the whole level.

Given a similar pattern the capital expenditure involved in shaft sinking would be spread over a far greater period than at present planned. It is for this very reason that it will be so important to sustain the high rate of deep-level development at this particular stage.

To maintain a close liaison with Government so essential to both Company and Government, the Company should have a Ghanaian on the Board of Directors. We have been most fortunate in obtaining the consent of Mr. C. W.

Tachie-Menson, C.B.E., a most distinguished citizen of Ghana, to act as a Director of the Company, and at the Annual General Meeting I shall have the honour to propose his election.

Mr. Tachie-Menson has had a distinguished career in Ghana, his most recent public appointments being Public Service Commission, 1951-56; Chairman, 1957; Chairman, Achimota Constitutional Conference.

The report and accounts were adopted.

KILLINGHALL TIN

MR. ADDINSELL'S STATEMENT

The Thirtieth Annual General Meeting of Killinghall Tin Limited was held on May 27 in London. Mr. Jack Addinsell, the chairman, presiding.

The following is an extract from his circulated statement:—

Last year I was obliged to conclude my statement on a somewhat pessimistic note. I am now glad to report, however, that the increase in quotas and permissible sales, together with the availability of some extra quota, enabled the mine to finish the period under review with a profit which, in the circumstances, must be regarded as satisfactory. Out of a total output of tin ore of 330 tons, we were permitted under the Malayan Tin Control Regulations to sell 233 tons, and at the end of the financial year we held unsold stocks totalling 124 tons.

After charging the usual overheads and depreciation and crediting interest on securities, etc., there was a profit for the year, before tax, of £25,524. Taxation requires £6,166 and your directors are recommending a dividend for the year of 25 per cent, requiring £22,969 net. The balance to be carried forward to the current financial year will be £19,197.

In my statement issued in May, 1957, I referred to the additional area of the Killinghall rubber estate for which application for conversion to mining was to be made to the State Government. I am now glad to report that the formalities have been completed and the sublease from the Rubber Company for this area, which on survey proves to be about 326 acres, is in process of completion. The recoverable values in this new land, together with those remaining in the present sublease will, it is estimated, occupy the dredge for at least a further 25 years. This figure is, of course, only an approximation and will be affected by a number of factors—such as the incidence of restriction, tin price and operating costs—which it is impossible to forecast so far ahead.

Provided the increased rates of quota continue and the tin price is maintained, the results for the current financial year should show improvement on those of the year under review.

The report and accounts were adopted.

For Sale—300 KW. Mercury Arc Rectifier, Input 6,600 volts. Output 500 volts 600 amps, with tapings by E.C.C. Equipment about 4 years old, practically unused. Price—£1,250, original cost £4,000. Davidsons Engineers (M/cr) Limited, Irkdale Street, Smedley Road, Cheetham Hill, Manchester 8. Telephone No. COLlyhurst 1610.

Personal

Mr. Richard D. B. Clark, general manager of Siskol Machines Ltd., has been appointed a director of that company. Mr. P. S. Elliston has also been appointed to the board.

★

Mr. F. G. Atherton has resigned from the board at the Cementation Co., owing to ill health. He will continue to serve in a consultative capacity.

★

Sheepbridge Equipment, a member company of the Sheepbridge Engineering Group, announce the appointment of Mr. H. J. Ball, a former works manager in the Group, to general manager. Mr. E. G. Scrannage is works manager. Mr. J. H. Lomas has left the firm's employment. Mr. A. Elliott takes over the position of chief buyer for the Sheepbridge Engineering Group.

WANTED

MINING, MECHANICAL and CIVIL ENGINEERS for long-range expanding mining operations. Applicants should be fully familiar with iron ore mining, maintenance of heavy mining and transportation equipment, supervision of drilling and blasting operations, long and short distance truck haulage. Knowledge of Spanish desirable. Reply to Box No. 663, *The Mining Journal Ltd.*, 15 Wilson Street, Moorgate, London, E.C.2.

EXPERIENCED GEOLOGIST required by a leading British gold-mining group in Ghana for underground and field work. Starting salary in the range £1,200-£1,500 according to experience and qualifications. 12 months abroad with 3 months' leave on full pay. Passages for applicant and wife and accommodation provided. The appointment is permanent and pensionable. Write with details of qualifications, experience and age to Box E3249, c/o Whites, 72/78 Fleet St., London, E.C.4.

MINING ENGINEER

Leading British gold mining group in Ghana requires Mine Captain holding degree in mining and with at least 5 years practical experience. Salary in the range of £1,300 to £1,500 with substantial monthly production bonus. 12 month tours and 3 months leave on full pay with passages paid for applicant and wife. Free accommodation and other benefits. Non-contributory pension scheme. Good social and sporting facilities and above all a position of great interest and opportunity with a progressive company.

Write with details of experience and qualifications to Box 665, *The Mining Journal Ltd.*, 15 Wilson Street, Moorgate, London, E.C.2.

THE CONSOLIDATED ZINC CORPORATION HIGHER GROUP PROFIT

The eleventh Annual General Meeting of The Consolidated Zinc Corporation Limited will be held on June 21 at 37 Dover Street, London, W.1.

The following is an extract from the Statement by **Mr. L. B. Robinson**, the chairman, which has been circulated with the report and accounts for the year ended December 31, 1959:

The voluntary restrictions on the sales of lead and zinc metal and concentrates by world producers during the last seven months of the year and the effect of the import quota imposed by the United States on these products throughout the year made 1959 an anxious year. The average London Metal Exchange price for prompt delivery of lead during 1959 was only £70 15s. 7d. compared with £72 16s. for 1958, but, fortunately, this was more than compensated by the increase in the zinc price from £65 18s. 1d. for 1958 to £82 4s. 8d. in 1959. We benefited considerably from the progress in the modernization and increased capacity of our smelting plant and also from licensing the Imperial Smelting process to other smelters. We can also report greater efficiencies at the mine at Broken Hill and at our other works. Due to these factors we are able to show considerably increased profits for 1959.

The Group profit before mining royalty and taxation amounted to £3,969,759, an increase of £1,241,568.

The Zinc Corporation, Limited showed an improved profit due partly to the rise in the zinc price more than compensating for the decrease in the tonnage of lead and zinc concentrates sold during the year and partly to a further increase in efficiency at the mine resulting in an appreciably lower cost per ton of ore treated. Consolidated Zinc Proprietary Limited again showed a steady increase in profits spread fairly evenly over the various activities in Australia. Titanium & Zirconium Industries Pty. Ltd. continued to deliver rutile and zircon at favourable prices arranged under contracts entered into in earlier years.

In the United Kingdom the profits from zinc smelting and sulphuric acid showed a substantial improvement over the previous year due mainly to the improved performance of the vertical retorts and particularly of the Imperial Smelting process plant at Avonmouth.

Mining royalty on the profits of The Zinc Corporation's mine amounted to £70,166, compared with £12,109 for 1958, and Australian taxation at £521,922 compared with £306,490 for 1958.

United Kingdom taxation amounted to £687,893 compared with £762,513 for 1958. The consolidated net profit for the year at £2,663,267 shows an increase of

£1,045,391 compared with 1958.

Transfers of £1,230,000 have been made to reserves, compared with £900,000 for 1958.

The directors recommend a final dividend of 2s. 9d. per share, giving a total distribution of 4s. per share, compared with 3s. for 1958. The balance carried forward amounted to £1,090,254, an increase of £5,099.

The Group's capital reserves have increased by £1,993,236, due almost entirely to the premium of 28s. per share on the rights issue of shares last year.

Capital expenditure by the Group during 1959 amounted to £3,563,608 and capital expenditure commitments at the end of 1959 amounted to £7,134,000.

The consolidated balance sheet shows a cash position of £8,083,835 compared with £6,002,869 in 1958.

NEW BROKEN HILL CONSOLIDATED HIGHER PROFIT DUE TO RECOVERY IN ZINC PRICE

The 24th Annual General Meeting of New Broken Hill Consolidated Limited will be held on June 21 at 37 Dover Street, London, W.1.

The following is an extract from the Statement by **Mr. L. B. Robinson**, which has been circulated with the report and accounts:

The low price level of lead prevailing at the end of 1958 continued during the year, but the price of zinc improved gradually to finish in December, 1959, at £95 3s. 10d. for prompt delivery metal, and the average London Metal Exchange prices for prompt delivery during 1959 were £70 15s. 7d. for lead and £82 4s. 8d. for zinc, compared with £72 16s. and £65 18s. 1d. for these metals respectively during 1958. Despite the incidence of restrictions on sales the higher zinc price, coupled with satisfactory forward contracts and a marked reduction in operating costs per ton of ore, resulted in a trading balance of £1,531,700, compared with £1,037,063 for 1958.

The profit before taxation amounted

to £1,190,847, compared with £696,303. There is a net profit of £796,238 compared with £476,317. The directors are recommending a final dividend of 1s. 6d. per share free of tax giving a total of 2s. 3d. per share compared with 1s. 4d.

For the second year in succession the Company budgeted for an output well below capacity and the 10 per cent. reduction in working time introduced at Broken Hill in February, 1958, continued to operate throughout the year under review. Nevertheless, increased productivity and slightly higher overall grade of ore and mill recoveries resulted in metal production in 1959 being higher than in 1958. The tonnage of ore treated by the Company rose by 11 per cent., the production of recoverable lead by 15 per cent. and zinc concentrate output was 8 per cent. higher.

The recoveries of lead and silver in lead concentrate improved satisfactorily.

Recovery of zinc in zinc concentrate fell fractionally but there was an important improvement in the grade of zinc concentrate.

The ore reserves fully outlined and developed ready for stoping or in the process of being stoped as at December 31, 1959, were calculated at 4,100,000 tons assaying 10.8% lead, 2.8 ounces silver and 12.7% zinc compared with 3,600,000 tons assaying 10.5% lead, 2.5 ounces silver and 12.9% zinc.

The plan and cross-sections accompanying the report illustrate the results of some of the work on the large siliceous zinc orebodies occurring in the upper levels. These are now known to extend laterally from our northern boundary to at least 3,500 feet south and provide means whereby production of zinc concentrate could be increased without correspondingly increasing the output of lead concentrate.

An examination of the details of the drilling done on those siliceous zinc orebodies has revealed between Sections 66 and 82, a distance of 1,040 feet, the existence of some four million tons of ore averaging 5 per cent. lead and 20 per cent. zinc, the opening up of which would procure major advantages if the present market conditions for zinc concentrate prevail. Consequently a programme for the development of this ore is being designed and, subject to no adverse change in the zinc price, stoping production is estimated to start in 1962.

SOUTH AFRICAN GOLD AND URANIUM PRODUCERS

Comparison and analysis of results for the first three months of 1960 and 1959

Heading		Jan. to March	Rand Cos.	Klerksdorp Cos.	O.F.S. Cos.	Total
Tons milled :	Millions	1960 1959	12.3 12.1	1.9 1.7	3.3 2.9	17.5 16.7
Ounces produced :	Millions	1960 1959	2.7 2.6	0.8 0.7	1.5 1.2	5.0 4.5
Grade per ton :	Dwt.	1960 1959	4.5 4.4	7.9 8.1	9.1 8.4	5.8 5.4
Working costs per ton : . . s. d.		1960 1959	40/4 40/2	60/11 56/11	60/7 60/6	46/5 45/4
Working profits :	Gold	£m. 1960 1959	10.0 8.7	3.8 3.7	9.0 6.4	22.8 18.8
	Uranium, etc.	£m. 1960 1959	2.5 2.5	2.9 2.8	1.9 1.8	7.3 7.1
	Total	£m. 1960 1959	12.5 11.2	6.7 6.5	10.9 8.2	30.1 25.9
Dividends declared :	£m.	1960 1959	— —	— —	8.0 7.4	8.0 7.4
Non-European employees at end March:		1960 1959	254,000 258,000	55,000 50,000	80,000 72,000	389,000 380,000
Number of Cos. included :		1960 1959	38 38	7 7	10 10	55 55

British Nylon Industrial Convention

The first fully comprehensive review of nylon's industrial uses ever staged in Britain was held last week at Park Lane House, London. This first British Nylon Industrial Convention opened with a private dinner for leading members of the British textile industry, prominent industrialists and representatives of government departments. The guest speaker was Lord Mills, K.B.E., Paymaster-General, who was introduced by Mr. F. C. Bagnall, C.B.E., managing director of British Nylon Spinners Ltd.

During two days thereafter textile manufacturers and representatives of industries using articles made from nylon textiles visited an impressive exhibition covering almost every aspect of nylon's industrial applications and heard technical and commercial papers presented by B.N.S. experts. Subjects covered by the papers included a review of the rapid progress made by nylon in the 10 years since the first special industrial yarns were produced, a description of the technical development work carried out by B.N.S., details about research into proofed nylon fabrics, a description of experimental work with heat-stretching processes and a discussion about the implications of the European Free Trade Area.

Many interesting developments were shown at the exhibition.

Rapidly increasing quantities of nylon are now being used in conveyor belting, much of which is used in British coal

mines. Somewhere around 20 per cent of all British conveyor belting now contains nylon. Although there have been solid-woven belts containing nylon for many years—and they have established a very high reputation for strength and durability—it is only during the past two years or so that nylon has also started to go into the plied belts.

Many belting manufacturers regard nylon as the most suitable fibre for this purpose as it has very high-tensile strength and outstanding shock strength as well as excellent flex strength, great resistance to abrasion, complete immunity to rotting and other valuable properties.

Its introduction has been hastened by a National Coal Board scheme designed to encourage manufacturers to develop new and tougher belts based on man-made fibres. It is significant that up to the present time the majority of the new belts to be given "limited approval" under this scheme are belts containing nylon.

The first of these belts were made from fabrics consisting of a nylon weft across a cotton warp. These are now produced by all leading British belting manufacturers. Many have now gone a stage further and are producing still tougher belts from fabrics containing nylon mixtures in both warp and weft.

Meanwhile, the first belts built from all-nylon fabrics are beginning to go into action. These have tremendous strength and are ideal for high tensile working.

Furthermore, they are completely rot-proof. Looking to the future, their introduction may ultimately lead to the complete redesign of conveyor installations since they make it possible to eliminate many transfer points.

Following the introduction of machine mining on a wide scale, more and more collieries are now finding it necessary to wash the coal brought up from the pit. Disposal of the dirty water presented a major problem until engineers devised a method of using filter presses to reduce the sludge from settling tanks to a handleable consistency. Virtually all the presses are clothed with nylon. In some collieries progress has been made recently with using rotary vacuum filters instead of presses and thus making the process continuous. Here again nylon is used with great success.

Coal mines are not the only place where conveyor belts containing nylon are being used. They are also going into power stations, gas works, gravel pits, brick works, hard stone quarries, iron and steel works as well as other mines. They have also aroused great interest overseas in countries such as India, Canada, South Africa, Chile and Malaya as well as in Europe.

A company refining borax from a crude ore has been able to reduce its annual filter cloth costs by more than 80 per cent by using nylon. The ground ore is slurried to extract the borax and the slurry is then filtered on presses. The sticky, clay-like cake is difficult to handle and has to be scraped from the cloths. Under these severe conditions a cotton cloth has a life of about two weeks but nylon cloths last about a year.



A perfect seal in a matter of seconds

For temporary pipelines 'Unicone' instantaneous joints are recommended. Comprising two parts only, they fasten with a "snap" ensuring a perfect seal in a matter of seconds.

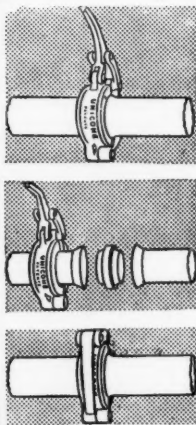
For permanent or semi-permanent pipelines 'Unicone' bolted-type joints are usually employed and can be assembled far more quickly than any flexible joint giving positive anchorage.

UNICONE

Flexible joints for Pipelines

Leakproof, safe, reliable

THE UNICONE CO. LTD., RUTHERGLEN, GLASGOW, SCOTLAND



MAP OF THE KLERKSDORP FIELD

- ★ While a mine is at the development stage, it is of vital importance to have a visual picture of its position in relation to the field as a whole. Otherwise the quarterly results published by the companies lose much of their significance.
- ★ Results reported from adjacent mines often have a direct bearing on the one in which you are interested, which, however, can only become apparent if you have clearly in mind the position of all the properties in relation to one another.
- ★ The Technical Map Service, located in Johannesburg, performs this service most effectively, for the Klerksdorp field. This map and its accompanying statistical handbook show:—

- the exact position of each mine on the field
- where in each property boreholes have been or are being sunk, how far they have gone and what the core recovery has been on reef intersection
- what shafts are being sunk, how far they have gone and what the final depth is expected to be.

Obtainable in London from

The Mining Journal

Price 25s. paper; 35s. linen
(plus 1s. postage)

Metal and Mineral Trades

A. STRAUSS & CO. LTD.

FOUNDED 1875

PLANTATION HOUSE, MINCING LANE, LONDON, E.C.3

METALS

Telephone: Mincing Lane 5551 (10 lines)
Telegrams: Strausar Phone London

Telex GB LN 28858

RUBBER

Telephone: Mansion House 9082 (3 lines)
Telegrams: Ascorub Phone London

MERCHANTS

EXPORTERS

IMPORTERS

Non-Ferrous Metals — Virgin, Alloys, Scrap

RUBBER

COPPER REFINERS

Members of the London Metal Exchange

Dealer Members of the Rubber Trade Association

Members of the National Association of Non-Ferrous Scrap Metal Merchants

EVERITT & Co. Ltd.

Teleg. Address: Persistent, Liverpool

40 CHAPEL STREET
LIVERPOOL

Phone: 2995 Central

SPECIALITY:

MANGANESE PEROXIDE ORES

We are buyers of:

**WOLFRAM, SCHEELITE, VANADIUM,
MOLYBDENITE, ILMENITE, RUTILE,
ZIRCONIUM and TANTALITE ORES**

Suppliers of:

FERRO-ALLOYS & METALS, NON-FERROUS ALLOYS

BLACKWELLS

FOR ALLOYS

*Buyers and
consumers of*

- COLUMBITE
- TANTALITE
- TUNGSTEN
- MANGANESE

**Makers of FERRO ALLOYS, NON-FERROUS ALLOYS
RARE METALS**

BLACKWELL'S METALLURGICAL WORKS

Dept. 11., THERMETAL HOUSE, GARSTON, LIVERPOOL, 19
Telephone: Garston 980 Telegrams: Blackwell, Liverpool

Telegrams: "BASSETT" PHONE, LONDON.

Telephone: MANSION HOUSE 4401/3.

BASSETT SMITH & Co. Ltd.

(Incorporating George Smith & Son)

15/18 LIME ST., LONDON, E.C.3

METALS,

ORES (Copper, Zinc, Lead, &c., Complex).

**RESIDUES, SKIMMINGS & ASHES
NON-FERROUS SCRAP**

ROURA & FORGAS, LTD.

Telephone No:
GERRARD 9641

Sole Sterling Area Suppliers of

ITALIAN QUICKSILVER

COLQUHOUN HOUSE,

27/37 BROADWICK STREET, LONDON, W.1

Cable Address: WAHCHANG, NEW YORK

WAH CHANG CORPORATION

(FORMERLY WAH CHANG TRADING CORPORATION)

233 BROADWAY

NEW YORK 7, NEW YORK

TUNGSTEN TIN

BUYERS



**Tungsten Concentrates, Tungsten Tin Concentrates
Mixed Tungsten Ores
Tungsten Tailings, Scraps, Tips, Grindings
Tin Concentrates—Tin Dross, Tin Furnace Bottoms**

SELLERS

**Tungsten Concentrates to Buyers' Specifications
Tungsten Salts, Tungsten Powder
Tungsten Rods and Wires
Tungsten Ingots, Tin Oxides, Tin Chlorides**

PLANT—GLEN COVE, NEW YORK

WORLD-WIDE
SERVICE

**DANIEL C.
GRIFFITH
& CO. LTD.
ASSAYERS**
TO THE BANK OF ENGLAND

**27/33, PAUL STREET,
LONDON, E.C.2.**

Branch Office : LEFKA, Cyprus
Represented throughout Great Britain

Analytical Chemists, Samplers
at all Ports and Works

Analyses of
**PRECIOUS METALS
BASE METALS
ORES and RESIDUES**
Etc.

Telephone :
MONARCH 1314 (3 lines)

Telegraphic Address :
"GRYFFYDD, LONDON"

Also in :
AUSTRALIA
BELGIUM
CANADA
DENMARK
FRANCE
GERMANY
HOLLAND
INDIA

ITALY
JAPAN
NEW ZEALAND
POLAND
PORTUGAL
SPAIN
SWEDEN
SWITZERLAND
U.S.A.

**AYRTON
AND
PARTNERS
LIMITED**

**NON-FERROUS METALS
ORES • MINERALS AND RESIDUES**

TELEPHONE : MONarch 7541
TELEX : LONDON 2-2475
CABLES : PARTONAYR

**IMPERIAL HOUSE
DOMINION STREET
LONDON . E.C.2**

BARNET METAL CO., LTD.

Elektron House, Brookhill Road, New Barnet, Herts
Phone: Barnet 5187 and 3901

**STOCKISTS OF: Aluminium, Brass and Copper
BUYERS OF: all non-ferrous scrap**

The RIGHT firm to deal with

**MINING &
CHEMICAL
PRODUCTS
LIMITED**

**86 Strand
London WC2
Telephone
Covent Garden
3393**

**Buyers of Ores,
Concentrates
and Residues of**

**BISMUTH
INDIUM
SELENIUM**

FRANK & SCHULTE

Handelsgesellschaft m.b.H.

(Incorporating Frank & Dieckmann G.m.b.H.)

ALFREDSTRASSE 152 POSTBOX 515

ESSEN, GERMANY

Telegrams: Silizium Teleprinter No. 0857835 Telephone: 44001

**ORES MINERALS FERRO-ALLOYS
METAL-ALLOYS METALS
CHEMICALS REFRACTORIES
SELENIUM and ROCK CRYSTAL**

Established 1922

OFFERS AND AGENCIES SOLICITED

RHONDDA METAL CO. LTD.

1 HAY HILL, BERKELEY SQ., LONDON, S.W.1.
Works: PORTH, GLAM.

**PHOSPHOR COPPER,
PHOSPHOR BRONZE, LEAD BRONZE,
GUNMETAL, BRASS**

Telephone : MAYFAIR 4654

Cables: RONDAMET

THE STRAITS TRADING COMPANY LIMITED

P.O. Box 700, OCEAN BUILDING, SINGAPORE

Works : SINGAPORE & PENANG

STRAITS REFINED TIN

— "THE STRAITS TRADING CO. LTD." BRAND —

THE BRITISH TIN SMELTING CO. LTD., LIVERPOOL

London Agents :

W. E. MOULSDALE & CO. LTD., 2 Chantrey House, Eccleston Street, S.W.1

THE CHROME COMPANY LTD.

Rhodesian and Transvaal Chrome Ores

*Metallurgical
Refractory and
Chemical Grades*

AVAILABLE FOR PROMPT SHIPMENT

103 MOUNT STREET • LONDON • W.I.

Telephone
HYDE PARK 9951

Telegrams
ORECOS LONDON

Telex
ORECOS LONDON 23189

**M
A
R
K
E
T
I
N
G**

**S
H
I
P
P
I
N
G**

ORES & MINERALS

MANGANESE · DIOXIDE
IRON · OXIDE
CHROME
VANADIUM
LITHIUM
ILMENITE · RUTILE · ZIRCON
ANTIMONY · BARYTES · TANTALITE etc.

FERRO-ALLOYS & METALS

FERGUSSON WILD

& COMPANY LIMITED

**BROKERS
CHARTERERS**

3 St. Helen's Place, London, E.C.3

Telephone: LONDON WALL 7022 (10 lines)

Cables: FERGUSONIA LONDON

Telex Number: GB LN 28801



BROKER MEMBERS OF THE BALTIC AND INTERNATIONAL MARITIME CONFERENCE

HUWOOD Conveyors



for Ironstone Mining

The above photographs show an interesting application of 'Huwood' conveyors to ironstone mining. The conditions are very wet, and slurry inevitably clings to both belt and rollers. Huwood disc impact rollers were therefore used as idler rollers to support the return belt throughout, an arrangement which, under the conditions, makes for much greater cleanliness.

Another point, too, which should be noticed is that the conveyor is fitted with the 'Huwood' Concentric Cable system by which the conveyor can be stopped instantly from any point in its length simply by giving a firm pull on a single cable. The 'Huwood' system works by 'breaking' rather than the customary method of 'making' a circuit and in consequence 'fails to safety'. Its operation does not depend on the reaction of an attendant.

Hugh Wood & Co. Ltd., will gladly supply on request details of these and other conveyor developments.

HUGH WOOD & CO. LTD.

Head Office and Factories:

GATESHEAD - ON - TYNE, II.

Telegrams: Huwood, Gateshead. Telephone: Low Fell 76083 (5 lines).

Industrial and Export Office:

ROYAL LONDON HOUSE, FINSBURY SQUARE, LONDON, E.C.2.

Telegrams: Huwood Stock, London. Telephone: Monarch 3273 (4 lines).

TB/FB/200

1960



he
rs
he

ic
oy
ry
he

nts.

D .

N, E.C.2.

(4 lines).

FB/FB/200

oad,